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Yours very truly Emlen Painter

F. GUTEKUNST, PRINT, PHILA.

PROCEEDINGS

OF THE

American Pharmaceutical Association

AT THE

THIRTY-EIGHTH ANNUAL MEETING,

HELD AT OLD POINT COMFORT, VA., SEPTEMBER, 1890.

ALSO THE

CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.

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LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Oct. 6, 1852.	Philadelphia, Pa. . .	*Daniel B. Smith*, Philadelphia.	*George W. Andrews*, Baltimore.	Samuel M. Colcord, Boston.	*C. Augustus Smith*, Cincinnati.
Aug. 24, 1853.	Boston, Mass. . . .	*William A. Brewer*, Boston.	George D. Coggeshall, New York.	*Alexander Duval*, Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854.	Cincinnati, O. . . .	*William B. Chapman*, Cincinnati.	Henry T. Cummings, Portland, Me.	*John Meakim*, New York.	*Joseph Laidley*, Richmond, Va.
Sept. 11, 1855.	New York, N. Y. . .	*John Meakim*, New York,	Charles B. Guthrie, Memphis, Tenn.	*Charles Ellis*, Philadelphia.	*Henry F. Fish*, Waterbury, Conn.
Sept. 9, 1856.	Baltimore, Md. . . .	*George W. Andrews*, Baltimore.	*John L. Kidwell*, Washington, D. C.	Frederick Stearns, Detroit, Mich.	*Henry T. Kiersted*, New York.
Sept. 8, 1857.	Philadelphia, Pa. . .	*Charles Ellis*, Philadelphia.	*James Cooke*, Fredericksburg, Va.	*Samuel P. Peck*, Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858.	Washington, D. C. .	*John L. Kidwell*, Georgetown, D. C.	Edward R. Squibb, Brooklyn, N. Y.	*James O'Gallagher*, St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859.	Boston, Mass. . . .	Samuel M. Colcord, Boston.	*William Procter, Jr.*, Philadelphia.	*Joseph Roberts*, Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860.	New York, N. Y. . .	*Henry T. Kiersted*, New York.	William J. M. Gordon, Cincinnati.	William S. Thompson, Baltimore.	Theodore Metcalf, Boston.
Aug. 27, 1862.	Philadelphia, Pa. . .	*William Procter, Jr.*, Philadelphia.	*John Milhau*, New York.	*Eugene L. Massot*, St. Louis.	*J. Faris Moore*, Baltimore.
Sept. 8, 1863.	Baltimore, Md. . . .	*J. Faris Moore*, Baltimore.	John M. Maisch, Philadelphia.	Chas. A. Tufts, Dover, N. H.	*George W. Weyman*, Pittsburgh.

Sept. 21, 1864.	Cincinnati, O. . . .	William J. M. Gordon, Cincinnati.	*Richard H. Stabler*, Alexandria, Va.	Enno Sander, St. Louis.	*Thomas Hollis*, Boston.
Sept. 5, 1865.	Boston, Mass.	*Henry W. Lincoln*, Boston.	*George C. Close*, Brooklyn, N. Y.	*Elijah W. Sackrider*, Cleveland, O.	Charles A. Heinitsh, Lancaster, Pa.
Aug. 22, 1866.	Detroit, Mich. . . .	Frederick Stearns, Detroit, Mich.	*Edward Parrish*, Philadelphia.	Ezekiel H. Sargent, Chicago.	*John W. Shedden*, New York.
Sept. 10, 1867.	New York, ...	*John Milhau*, New York.	Robert J. Brown, Leavenworth, Kan.	N. Hynson Jennings, Baltimore.	*Daniel Henchman*, Boston.
Sept. 8, 1868.	Philadelphia, Pa. . .	*Edward Parrish*, Philadelphia.	*Ferris Bringhurst*, Wilmington, Del.	*Edward S. Wayne*, Cincinnati.	Albert E. Ebert, Chicago.
Sept. 7, 1869.	Chicago, Ill.	Ezekiel H. Sargent, Chicago.	Ferdinand W. Sennewald, St. Louis.	John H. Pope, New Orleans.	Joel S. Orne, Cambridgeport, Mass.
Sept. 13, 1870.	Baltimore, Md. . . .	*Richard H. Stabler*, Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	*Eugene L. Massot*, St. Louis.
Sept. 12, 1871.	St. Louis, Mo. . . .	Enno Sander, St. Louis.	C. Lewis Diehl, Louisville, Ky.	George F. H. Markoe, Boston.	Matthew F. Ash, Jackson, Miss.
Sept. 3, 1872.	Cleveland, O. . . .	Albert E. Ebert, Chicago.	*Samuel S. Garrigues*, East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	Henry C. Gaylord, Cleveland, O.
Sept. 16, 1873.	Richmond, Va. . . .	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	*Paul Balluff*, New York.
Sept. 8, 1874.	Louisville, Ky. . . .	C. Lewis Diehl, Louisville, Ky.	*Joseph Roberts*, Baltimore.	William T. Wenzell, San Francisco.	Augustus R. Bayley, Cambridgeport, Mass.
Sept. 7, 1875.	Boston, Mass. . . .	George F. H. Markoe, Boston.	Frederick Hoffmann, New York.	T. Roberts Baker, Richmond, Va.	Christian F. G. Meyer, St. Louis.
Sept. 12, 1876.	Philadelphia, Pa. .	Charles Bullock, Philadelphia.	Samuel A. D. Sheppard, Boston.	*Gustavus J. Luhn*, Charleston, S. C.	Jacob D. Wells, Cincinnati.
Sept. 4, 1877.	Toronto, Can. . . .	William Saunders, London, Ont.	Ewen McIntyre, New York.	John Ingalls, Macon, Ga.	*Emlen Painter*, San Francisco.
Nov. 26, 1878.	Atlanta, Ga.	*Gustavus J. Luhn*, Charleston, S. C.	Frederick T. Whiting, Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	*William H. Crawford*, St. Louis.

LIST OF OFFICERS. (Continued.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 9, 1879 .	Indianapolis, Ind. .	George W. Sloan, Indianapolis, Ind.	T. Roberts Baker, Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	Philip C. Candidus, Mobile, Ala.
Sept. 14, 1880 .	Saratoga, N. Y. . .	James T. Shinn, Philadelphia.	George H. Schafer, Fort Madison, Ia.	William S. Thompson, Washington.	William Simpson, Raleigh, N. C.
Aug. 23, 1881 .	Kansas City, Mo. . .	P. Wendover Bedford, New York.	*Emlen Painter*, San Francisco.	George Leis, Lawrence, Kan.	John F. Judge, Cincinnati.
Sept. 12, 1882 .	Niagara Falls, N. Y.	Charles A. Heinitsh, Lancaster, Pa.	John Ingalls, Macon, Ga.	Louis Dohme, Baltimore.	William B. Blanding, Providence, R. I.
Sept. 11, 1883 .	Washington, D. C. .	William S. Thompson, Washington, D. C.	Charles Rice, New York.	*Frederick H. Masi*, Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884 .	Milwaukee, Wis. . .	John Ingalls, Macon, Ga.	John A. Dadd, Milwaukee, Wis.	Henry Canning, Boston, Mass.	Charles F. Goodman, Omaha, Neb.
Sept. 8, 1885 .	Pittsburgh, Pa.. . .	*Joseph Roberts*, Baltimore, Md.	Albert H. Hollister, Madison, Wis.	Albert B. Prescott, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886 .	Providence, R. I. .	Chas. A. Tufts, Dover, N. H.	*Henry J. Menninger*, Brooklyn, N. Y.	M. W. Alexander, St. Louis, Mo.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887 .	Cincinnati, O. . . .	John U. Lloyd, Cincinnati, O.	M. W. Alexander, St. Louis, Mo.	A. K. Finlay, New Orleans, La.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888 .	Detroit, Mich. . . .	M. W. Alexander, St. Louis, Mo.	Jas. Vernor, Detroit, Mich.	Fred. Wilcox, Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889 .	San Francisco, Cal. .	*Emlen Painter*, New York.	Karl Simmon, St. Paul, Minn.	Wm. M. Searby, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890 .	Old Pt. Comfort, Va.	A. B. Taylor, Philadelphia.	A. B. Stevens, Ann Arbor, Mich.	Chas. F. Dohme, Baltimore, Md.	Jas. M. Good, St. Louis, Mo.
April 27, 1891 .	New Orleans, La. .				

TREASURERS.

Alfred B. Taylor, Philadelphia, 1852–54.
Samuel M. Colcord, Boston, 1854–56, and 1857–59.
James S. Aspinwall, New York, 1856–57.
Ashel Boyden, Boston, 1859–60.
Henry Haviland, New York, 1860–63.
J. Brown Baxley, Baltimore, 1863–65.
Charles A. Tufts, Dover, N. H., 1865–86.
Samuel A. D. Sheppard, Boston, 1886–91.

RECORDING SECRETARIES.

George D. Coggeshall, New York, 1852–53.
Edward Parrish, Philadelphia, 1853–54.
Edward S. Wayne, Cincinnati, 1854–55.
William J. M. Gordon, Cincinnati, 1855–59.
Charles Bullock, Philadelphia, 1859–60.
James T. Shinn, Philadelphia, 1860–62.
Peter W. Bedford, New York, 1862–63.
William Evans, Jr., Philadelphia, 1863–64.
Henry N. Rittenhouse, Philadelphia, 1864–65.
John M. Maisch, Philadelphia, 1865–91.

CORRESPONDING SECRETARIES.

William Procter, Jr., Philadelphia, 1852–53, and 1854–57.
William B. Chapman, Cincinnati, 1853–54.
Edward Parrish, Philadelphia, 1857–58.
Ambrose Smith, Philadelphia, 1858–59.
William Hegeman, New York, 1859–60.
Peter W. Bedford, New York, 1860–62, and 1863–66.
John M. Maisch, Philadelphia, 1862–63.

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1868 . . Alfred B. Taylor.
1869 . . Henry W. Fuller.
1870 . . *J. Faris Moore.*
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1872 . . Henry C. Gaylord.
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1874 . . Emil Scheffer.
1875 . . Samuel A. D. Sheppard.

For the meeting held in
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1877 . . Henry J. Rose.
1878 . . Jesse W. Rankin.
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1880 . . Charles F. Fish.
1881 . . William T. Ford.
1882 . . *Hiram E. Griffith.*
1883 . . Charles Becker.
1884 . . Henry C. Schranck.

For the meeting held in
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1886 . . William B. Blanding.
1887 . . George W. Voss.
1888 . . James Vernor.
1889 . . Edward W. Runyon.
1890 . . Charles E. Dohme.
1891 . . A. K. Finlay.

REPORTER ON PROGRESS OF PHARMACY.

C. L. Diehl, Louisville, Ky., 1873–91.

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Resolved, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

Alabama,	P. C. Candidus,	Mobile.
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California,	William T. Wenzell, 322 Polk street,	San Francisco.
Colorado,	Edmund L. Scholtz, Sixteenth & Stout streets,	Denver.
Dis. of Columbia,	John A. Milburn, 1120 Thirteenth St., N. W.,	Washington.
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	Warren A. Spalding, 19 Church street,	New Haven.
	Luzerne I. Munson, Apothecaries' Hall,	Waterbury.
Delaware,	Linton Smith, Church and Bennett streets,	Wilmington.
Georgia,	Theo. Schumann, Whitehall and Hunter streets,	Atlanta.
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	John Ingalls, Fourth and Poplar streets,	Macon.
Illinois,	David G. Plummer, 6 Main street,	Bradford.
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	Charles Zimmermann, 423 S. Adams street,	Peoria.
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	George W. Sloan, 304 N. Meridian street,	Indianapolis.
	David Hilt, 84 Main street,	Lafayette.
	Jacob Baur, 701 Wabash avenue,	Terre Haute.
Iowa,	John W. Ballard, 106 West Second street,	Davenport.
	Theodore W. Ruete, 379 Main street,	Dubuque.
	George H. Schafer, 129 Front street,	Fort Madison.
	Silas H. Moore, 80 Fourth street,	Sioux City.

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	Robert J. Brown, 113 Delaware street,	Leavenworth.
Kentucky,	George A. Zwick, Eleventh street and Madison avenue,	Covington.
	William H. Averill, 435 Main street,	Frankfort.
	C. Lewis Diehl, Third street and Broadway,	Louisville.
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Massachusetts,	S. A. D. Sheppard, 1129 Washington street,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, 51 Vine street,	Charlestown.
	Frederick T. Whiting, Main street,	Great Barrington.
	Freeman H. Butler, 141 Central street,	Lowell.
	James E. Blake, 65 North Second street,	New Bedford.
	Joseph J. Estes, Union and Church streets,	Rockland.
	Thomas B. Nichols, 159 Essex street,	Salem.
	William Bush, 56 Front street,	Worcester.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
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	Jacob Jesson, Western avenue and Jefferson street,	Muskegon.
Minnesota,	E. Floyd Allen, 1020 Hennepin avenue,	Minneapolis.
	Karl Simmon, Seventh and Sibley streets,	St. Paul.
Mississippi,	Joseph W. Eckford, Commerce street,	Aberdeen.
	Matthew F. Ash,	Jackson.
Missouri,	William T. Ford, 1305 Cherry street,	Kansas City.
	James M. Good, 2348 Olive street,	St. Louis.
Nebraska,	Charles F. Goodman, 180 Farnham street,	Omaha.
Nevada,	William A. Perkins, 213 Main street,	Virginia City.
New Hampshire,	Nelson S. Whitman, 175 Main street,	Nashua.
New Jersey,	Albert P. Brown, Fifth and Federal streets,	Camden.
	Wm. M. Oliver, 132 Broad street,	Elizabeth.
	Hermann Klussmann, Fourth street and Lafayette avenue,	Hoboken.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 831 Broad street,	Newark.
	Howard P. Reynolds, Park and North avenues,	Plainfield.
New York,	Charles H. Gaus, 202 Washington avenue,	Albany.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. Dubois, 281 Main street,	Catskill.
	John Hepburn, 103 Main street,	Flushing.
	Harvey G. Goodale, P. O. Box 29,	Jamaica.
	James T. King, Main and South streets,	Middletown.
	John McKesson, Jr., 91 Fulton street,	New York.
	G. H. Haass, 105 East Main street,	Rochester.
	John G. Bissell, 45 Dominick street,	Rome.
	Charles F. Fish, 114 Broadway,	Saratoga.
	Willis T. Hanson, 195 State street,	Schenectady.
	Charles W. Snow, 28 East Genesee street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.

North Carolina,	William Simpson, 33 Fayetteville street,	Raleigh.
	John H. Hardin, 124 South Front street,	Wilmington.
Ohio,	Andrew M. Armstrong, 106 East Market street,	Akron.
	Walter H. Howson, Water and Walnut streets,	Chillicothe.
	J. U. Lloyd, Court and Plum streets,	Cincinnati.
	George H. Hechler, 1099 Broadway,	Cleveland.
	Charles Huston, 43 South High street,	Columbus.
	Thomas J. Casper, 41 East Main street,	Springfield.
	Charles Hohley, 248 South street,	Toledo.
	Edgar M. Hatton, Fifth and Main streets,	Zanesville.
Oregon,		Portland.
Pennsylvania,	Jacob A. Miller, Second and Chestnut streets,	Harrisburg,
	Charles A. Heinitsh, 16 East King street,	Lancaster.
	Joseph L. Lemberger, 8 North Ninth street,	Lebanon.
	Richard M. Shoemaker, Fourth and Race streets,	Philadelphia.
	George A. Kelly, 101 Wood street,	Pittsburgh.
	Philip M. Ziegler, 526 Penn street,	Reading.
	John M. McNeil, Broadway,	Scottdale.
	Edward A. Cornell, Tenth and Pine streets,	Williamsport.
Rhode Island,	James H. Taylor, 104 Thomas street,	Newport.
	Wm. K. Reynolds, 254 Friendship street,	Providence.
South Carolina,	Charles F. Panknin, 181 Meeting street,	Charleston.
Tennessee,	Jas. S. Robinson, Second and Madison streets,	Memphis.
	John C. Wharton, Vine and Church streets,	Nashville.
Texas,	Thomas W. Powell, 10 Houston street,	Fort Worth.
Vermont,	Geo. A. Crossman, 2 Simonds Block,	Brandon.
Virginia,	T. Roberts Baker, 919 East Main street,	Richmond.
Washington,	Henry E. Holmes, 19 Main street,	Walla Walla.
West Virginia,	Edwin L. Boggs, Kanawha Bank Building,	Charleston.
	Edmund Bocking, 1 Odd Fellows' Hall,	Wheeling.
Wisconsin,	John R. Drake, 365 East Water street,	Milwaukee.
	Albert H. Hollister, 25 Pinckney street,	Madison.
Prov. Nova Scotia,	Francis C. Simson,	Halifax.
Prov. Ontario,	John Lowden, 18 DeBreseles street,	Toronto.
Prov. Quebec,	Henry R. Gray, 144 St. Lawrence Main street,	Montreal.

THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are three permanent Funds at the present time, all of which are invested in government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II, Section 7 (afterwards Section 8), contained the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87–96), and is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the annual interest of which only shall be used by the Association for its current expenses.*"

Chapter VI, Article 5, of the By-Laws adopted the same year, read as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) so as to apply also to those who have been members for over twenty years (see Chapter VIII, Article 4 of By-Laws). Under this clause the life membership (new style) of the present roll is thirty-two, as published in the Proceedings, page 736.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75, for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884 (p. 524) $944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147), it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471), the Association ordered again a transfer to the same fund of $4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the Life Membership Fund is invested. The report published on page 19 of the present volume shows that on July 1, 1890, the value of the Life Membership Fund was $9,570.44, of which sum *the annual interest only shall be used by the Association for its current expenses.*

THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings. p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products; the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize.*

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler, and for 1890, to Wm. T. Wenzell.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On July 1, 1890 (Proceedings, p. 19) its reported value was $764.98. The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia, was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum, in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526, 528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when $582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII. (Proceedings 1881, pp. 490, 549). Members have not availed themselves of this Fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Rob. B. Warder for material used for investigations reported in 1885, and $96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16).

The original sum of $1117.81 ($525+582.81) had increased in 1883 to $1232.76. Since 1887 the securities in which the Fund is invested are specified in the reports of the Chairman of the Council; the reported value was $1459.04 in July 1890 (see Proceedings, p. 19). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

AMENDMENT TO THE CONSTITUTION.

TO BE ACTED ON AT THE THIRTY-NINTH ANNUAL MEETING.

At the first session of the Old Point Comfort meeting (see Proceedings, page 29) Mr. A. E. Ebert moved to amend the Constitution:

Article III. By inserting in second line, after the words "Permanent Secretary," the words, "an Assistant Secretary," so as to make the article read as follows:

Article III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, an Assistant Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

AMENDMENTS TO THE BY-LAWS.

TO BE ACTED ON AT THE THIRTY-NINTH ANNUAL MEETING.

At the second session (see Proceedings, page 34; also pages 36, 37 and 38), Mr. A. E. Ebert moved to amend the By-Laws:

Chapter VIII., Article II. By inserting in the last line, after the words "and paying," the words "an initiation fee of five dollars and," so as to make that article read as follows:

Article II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and if the Association shall by vote invite said person to become a member, his membership shall be completed by his signing the Constitution and By-Laws, and paying an initiation fee of five dollars and the annual contribution for the current year.

The amendments, of which notice was given by Mr. Hallberg at the Ninth Session (see Proceedings, page 45), have been formulated as follows:

Chapter VII., Article I. In first line strike out *five* and insert in place thereof the word *six;* in the second line strike out the word *and*, and insert after the word *Pharmacopœia* the words *and a Committee on Transportation*, so as to make the article read as follows:

Article I. There shall be six Standing Committees, a Committee on Commercial

Interests, on the Revision of the Pharmacopœia, and a Committee on Transportation, each to consist of five members; a Committee on Scientific Papers, a Committee on Prize Essays, and a Committee on Pharmaceutical Legislation and Education, each to consist of three members.

Then add to Chapter VII.:

Article IX. The Committee on Transportation, which shall be elected by the Association, shall consist of one member each from the cities of New York, Chicago, St. Louis, Cincinnati and New Orleans. The Committee shall elect its own Chairman, and shall have power to fill any vacancy which may occur, and to increase its number by the appointment of members from other localities. In conjunction with the Local Secretary, the Committee shall arrange for transportation from the different sections of the United States to the place of meeting and return.

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PREFATORY NOTICE.

This volume is issued with the portrait of the late Emlen Painter, of whose life and services notices will be found on pages 15, 25 to 27, and 735. It will be mailed or sent by express to every member reported as being entitled thereto according to the By-Laws.

With the exception of 1856 (out of print), and 1861 (none published), the Proceedings of the Association can still be furnished complete, beginning with the initial meeting in 1851; but of several years only a limited number of copies remains on hand. The Committee on Publication, thinking that many members would like to complete their sets, has decided to considerably reduce the price of the older volumes, and to offer them, *including postage*, as follows:

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For any twenty-three to thirty-two volumes a discount of 50 per cent. on the above prices.
For any more than thirty-two volumes a discount of 60 per cent. on the above prices.

The NATIONAL FORMULARY, published by the Association in 1888, is sold at the following prices, including postage: bound in cloth, 75 cents; cloth, interleaved, $1.10; cloth, raised nails (for use in the laboratory), 90 cents; sheep, $1.10; sheep, interleaved, $1.25. For sale by the Authorized Agents of the Association, by wholesale druggists and booksellers.

All orders for Proceedings should be addressed to the Permanent Secretary, John M. Maisch, 143 North Tenth street, Philadelphia, Pa.

The price of the nickel badge has been reduced by vote of the Council to 25 cents, on receipt of which sum by the Permanent Secretary the badge will be sent by mail.

The Thirty-ninth Annual Meeting will be held at New Orleans, La., on the last Monday, 27th day of April, 1891, at 3 o'clock p. m., as will be seen from the following preamble and resolution adopted by the Council:

Moved by John M. Maisch, seconded by Alex. K. Finlay:

"WHEREAS, The Council has been empowered to change the date of the next annual meeting—viz: the first Monday (4th) of May, 1891—so as not to clash with that of the American Medical Association; and

WHEREAS, The meeting of the American Medical Association will be held at Washington, D. C., beginning on the first Tuesday (5th) of May, 1891; therefore be it

Resolved by the Council, that the date of the meeting of the American Pharmaceutical Association be changed so that it commence in the city of New Orleans on the last Monday (27th) of April, 1891."

Blank forms for recommendations for membership may be obtained from the Permanent Secretary or from the Committee on Membership. Such recommendations should reach the Secretary of the Committee, George W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to the care of the Local Secretary at New Orleans, La.

Mr. Theodric Smith, Baltimore, elected at the last meeting, has completed his membership in time for inserting the name in the Alphabetical List of Members. Mr. Geo. C. Close, Vice-President in 1865, died January 13; the death is recorded on page ix.

Following the practice introduced last year, the lists of queries have not been printed as part of the Proceedings, but a copy of the queries will be mailed with the present volume to every member of the Association.

Members are particularly reminded to give early attention to the requests printed at the head of the "roll" and of the "alphabetical list" (pages 778 and 800), to prevent annoyance and disappointment, and to insure promptness in all cases. A similar request as to the other lists printed in the Appendix, is made of all who may be interested therein.

MINUTES

OF THE

THIRTY-EIGHTH ANNUAL MEETING.

FIRST SESSION—MONDAY AFTERNOON, SEPTEMBER 8, 1890.

The American Pharmaceutical Association met at its thirty-eighth annual meeting, in the Concert and Ball-room of the Hygeia Hotel at Old Point Comfort, Va., on Monday, September 8, 1890, when, owing to the death of President Emlen Painter, the Acting President, First Vice-President Karl Simmon, took the chair, and more than a quorum being present, called the meeting to order at 3 : 30 p. m.

Mr. T. Roberts Baker, of Richmond, addressed the Association in words of welcome on behalf of the pharmacists of Virginia, and spoke as follows :

It is a duty that has devolved upon me, as well as a great pleasure, to welcome this Association to the soil of Old Virginia. Many of the members who are now present will remember the meeting of 1873, which was held at Richmond. It was my good fortune, on that occasion, to be the Chairman of the Reception Committee; and I am happy to say that a most enjoyable and profitable time was spent. We will endeavor to make it so now, and, in extending a hearty greeting, assure you that nothing will be left undone to make your visit so truly pleasant that you will depart well satisfied with the result of your choice of this State as your place of meeting.

The chair called upon Mr. Alexander, of St. Louis, who responded briefly by extending hearty thanks to the speaker for the sentiments expressed, and by referring to the attractive surroundings of Old Point Comfort, and to the historical reminiscences connected therewith ; all of which gave assurance to those present that a wise selection had been made for holding the meeting of 1890.

The President now called upon Vice-President Eckford to occupy the chair, and then proceeded to deliver the President's annual address as follows :

FELLOW MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION :

When last we met, thousands of miles across the continent, at the Golden Gate, we elected a man to preside over the affairs of this Association, who, in every respect, was worthy and capable of doing so, and we hoped to have him with us this year. Prof. Painter, who was one of the hardest and most earnest workers in our Association, and who, more than any one else, was instrumental in inducing us to hold our last meeting on the Pacific Coast, has been called to his last rest by the grim and silent reaper, before he hardly had time to assume the management of the Association. He went out with us in good health, but the strain and worry brought on by his untiring efforts in looking after the comfort of the excursionists of whom he had charge, caused him to neglect himself, and developed what at first seemed but a slight cold, into the dreadful malady which undermined his system and brought him to an untimely death.

Our Association has had few members who have taken deeper interest in the pharmaceutical profession, both in a practical and scientific way. Always promptly attending the Association meetings and taking active part in all business and scientific discussions, as well as furnishing numerous highly-prized articles, by his pen, to the pages of our Proceedings, our deceased President will always be missed at our gatherings, but never be forgotten in our hearts. I suggest that our Association appoint a Committee to draw up suitable resolutions, expressing our heartfelt sympathy for his family.

Through the sad and unfortunate death of our President, it devolves upon me to address you on this occasion, and I trust and hope, knowing what a poor successor he has that you will be lenient and forbearing with me, in the performance of these, my new duties.

The past year has furnished very little of interest to the pharmaceutical profession, aside from the general interest that centres around the Convention of the Committee on the Revision of the Pharmacopœia. The action of the Convention in the adoption of the Metric System will, of course, give rise to a good deal of unfavorable comment among the average druggists, who have so long been wedded to the old system that they cannot, very easily, tear themselves from their old ruts.

But the requirements of science, in all its various branches, demand something more definite than our old systems; and the Metric System having been tried and used for several decades, with increasing popularity, by the scientific men of the different countries, there is very little excuse for an educated class of people, such as the pharmacists are or claim to be, to stand out any longer and make a fight against it. To render the system as convenient as the old, all that is necessary for the pharmacist to do is to provide himself with sets of Metric weights and measures for his prescription case, and he will be surprised to see in how short a time he familiarizes himself with the same, and how much time he can save in calculations. The writer knows this, from actual experience.

It had been expected that a great many of the newer halogen derivatives and compounds would be accepted and introduced into the new Pharmacopœia. The manufacture of some of these articles being under patent processes, of course justifies the action of the Convention to a certain extent; at the same time there are a great many of these compounds which have such a firm hold in the medical profession, that it is to be regretted that they cannot be incorporated in the new Pharmacopœia. With a large number of pharmacists this is the only source of information in regard to such preparations, and it is expected that the Committee will yet see a way out of the difficulty and to do the pharmacist justice, if in no other way, perhaps by adding or furnishing a supplement on the subject.

The American Pharmaceutical Association has been very ably represented by the Committee appointed by Prof. Painter, and all attended the Convention, with the exception of Prof. Mohr of Alabama, who was prevented from so doing by ill health. Mr. Wm. Simpson, of Raleigh, N. C., was appointed, and kindly served in his stead. We expect a very complete and interesting report from this Committee. Our Association was honored by the election of our old friends and faithful workers, Messrs. A. E. Ebert of Chicago, Wm. S. Thompson of Washington, and Wm. M. Searby of San Francisco, as

Vice-Presidents, and G. H. Chas. Klie of St. Louis as Assistant Secretary of the Committee, all of whom we are certain will bring as much honor to the Revision Convention as they do to us. Of the 25 members of the Revision Committee, we find seventeen who are members of our Association, to wit: Prof. W. G. Gregory, of the Buffalo College of Pharmacy; Prof. P. W. Bedford, of the New York College of Pharmacy; Prof. H. H. Rusby, also of the New York College of Pharmacy; Prof. Geo. F. H. Markoe, of the Massachusetts College of Pharmacy; Dr. R. G. Eccles, of Brooklyn; Profs. J. M. Maisch and J. P. Remington, of the Philadelphia College of Pharmacy; Prof. O. Oldberg, of the Illinois College of Pharmacy; Prof. F. B. Power, of the University of Wisconsin; Prof. C. S. N. Hallberg, of the Chicago College of Pharmacy; Prof. L. E. Sayre, of the University of Kansas; Prof. O. A. Wall, of the St. Louis College of Pharmacy; Prof. C. O. Curtman, of St. Louis; Prof. C. L. Diehl, of Louisville; Prof. Chas. Mohr, of Mobile; Dr. Chas. Rice, of New York, and Mr. Alfred B. Taylor, of Philadelphia. With such an array of talent, we have a right to look for great results in the next issue of the Pharmacopœia, as all are known to be practical men as well as instructors.

The committee appointed two years ago to visit the American Medical Association, were unable to report at the last meeting in California, as the medical convention was held at about the same time as ours, and the intervening time was too brief for them to inform us as to results achieved from their visit. They will undoubtedly be prepared to furnish us with a very complete report in regard to their mission, and one of great interest to the pharmacists of the country, who are anxious to know what attitude is taken by the medical profession towards them. Much is expected from the new Section of Materia Medica and Pharmacy, which has been established in the American Medical Association. At the next meeting of that Association, to be held, I think, in Washington next year, we should have a strong and able committee, thoroughly informed on subjects desirable for discussion. These subjects should not so much be the questions of trade issues, such as physicians, dispensing, counter prescribing by the druggist, etc., as the desirability of having uniformity in medicines and improvements in quality thereof. They should be especially requested to co-operate in making the United States Pharmacopœia and the National Formulary (or that part of it which will not be incorporated into the United States Pharmacopœia), as national authority for the dispensing of medicines. The subject of the endorsement of proprietary articles by medical men, afterwards to be used by shrewd manufacturers to boom such preparations in the well-known "cure-all" manner, should also receive attention from this committee, although, I admit, it will necessarily have to be done in a diplomatic and kid-glove manner.

The subject of legislation, and that intimately connected with it—"education," should receive such attention from our Section on Legislation, as to evolve a plan, in the near future, which would insure more uniformity in our pharmacy laws, as well as in the curriculum followed by the various Colleges of Pharmacy throughout the United States. Without some uniformity in either of these, it will be a long time before we can reach a satisfactory solution of the question of interchange of certificates from one State Board to another.

As it is intended to hold a convention of the various secretaries of the different States, at the present time and in this place, and as a committee was appointed to investigate this subject, it might be well for the Section on Legislation to invite this committee and these secretaries to participate with them in deliberation on this question, and perhaps the work would result in the crystallization of a definite and feasible plan which could be submitted for approval to the American Pharmaceutical Association and the different State Associations and State Boards.

The always annoying and ever vexing question of apprentices should also receive more attention from this Section. There should be a general outline plan submitted, which could be followed by a pharmacist when engaging apprentices, covering the question of their qualification and education, as well as remuneration. Such a course, while it could not be arbitrarily enforced would undoubtedly give a healthy tone to the present so demoralized apprentice system. Every trade has such a system, and there is none that needs it so much as our profession. The National Association taking a hand in this, would help matters wonderfully, and I think it is time the American Pharmaceutical Association should come forward and assume its prerogatives and do its duty towards the pharmacists of the country. There must be a leader and a head to every thing, and the American Pharmaceutical Association must naturally occupy this position towards the pharmacists of the country, and they, the Pharmacists and State Associations, look towards this Association as the parent of all of them, and expect it to do these things and will respect it for so doing.

The Commercial Section has many problems before it, but they are probably all very difficult of solution. It would be very interesting and instructive to have a report from that Section about the co-operative systems which have been tried for some time in Chicago, New York and Philadelphia. A report of this kind, complete in facts and figures, would be of great value to the druggists in the larger cities, where they have to contend with the growing evil of cutting in prices. As we all well know and are realizing more and more every day, the purely trade branches of pharmacy are slowly but surely drifting into the hands of the general dealers, the effects of which are noticeable in the fact that the drug stores are not increasing in the same ratio as formerly in the large cities; this is the best proof that there is no money in it.

Here, again, a good rigid system of apprenticeship would come into play, as it would shut the door to the persons who want to enter our profession only for the sake of the dollars they think are in it, and each of whom will, at the first opportunity that offers, get somebody to put up a few hundred dollars for him and open a pharmacy, regardless of the qualification he brings to the same. It is these uneducated and incompetent persons who have ruined and are ruining the drug business; and the sooner we stop manufacturing this low grade of goods, the sooner can we expect better remuneration for the hours of labor and worry we bring to our business.

Our Association has an immense field to draw on, and yet we only number our members in the hundreds, while we should reach the thousands. Considering that we have over 30,000 drug stores in the United States, and on an average at least two qualified pharmacists to each, we certainly have a comparatively small number in our Association. It is believed that this is due in a large measure to the fact that there is a lack of proper acquaintance of the pharmacists with the objects of this Association. You have noticed in your State Association meetings that if you can prevail upon druggists to attend the annual State meetings and give them an opportunity to see the work that is being done by the Associations, it is no trouble to induce them to join, whereas otherwise it is almost impossible to reach them.

A suggestion has been made that every President of a State Pharmaceutical Association be made a Vice-President of the National Association. Such an arrangement may be instrumental in bringing the greater number of the thirty odd Presidents of State Associations to the meetings, and enlist their interest in behalf of this Association.

Our worthy ex-president, Mr. Alexander, offered some valuable suggestions last year in regard to the question of our finances. He called attention to the fact that we were living beyond our means, and upon the strength of his recommendations, a committee was appointed to formulate a system of financiering for the future, which will take care of all arising contingencies. The committee will report in its order, and its report should receive proper attention.

During the past year a communication was received from the Montpellier University in France, announcing the celebration of the Sixth Centennial Anniversary, and inviting this Association to send delegates to participate in its memorial exercises. This was answered by the proper officials, acknowledging and thanking them for the courtesy, expressing our regrets in being unable to send proper representatives, and wishing them renewed prosperity in the future for their highly useful and deserving institution. The following embraces the correspondence:

MONTPELLIER, LE 1er MARS, 1890.

Université de France—Conseil Général des Facultés de Montpellier.—

Monsieur le Secrétaire Général: Le Conseil Général des Facultés de Montpellier a décidé de célébrer au mois de Mai prochain le VIme Centenaire de l'Université dont l'heritage lui est confié. Le 26 Octobre 1289, une bulle du Pape Nicolas IV érigeait en *Studium generale* les Facultés de Droit, de Médecine et des Arts, qui existaient déjà depuis longtemps dans notre ville. Le septième siècle de notre vie universitaire a donc commencé au mois d'Octobre dernier; nos fêtes commémoratives en marqueront la première année.

Nous ne doutons pas que tous les hommes dévoués à la science ne s'associent à nous pour donner le plus d'éclat possible à une solennité qui glorifiera une longue tradition de haut enseignement.

Les fêtes auront lieu à Montpellier vers la fin de Mai; la date précise vous sera communiquée ultérieurement. Nous espérons que vous voudrez bien nous faire l'honneur d'y assister. Nous vous demandons en même temps de communiquer cette invitation aux Membres de votre Académie, afin qu'elle puisse se faire représenter à nos fêtes. Nous vous serions reconnaissants de nous faire connaître, le plus tôt que vous le pourrez, les noms des délégués qui auront été choisis.

Veuillez agréer, Monsieur le Secrétaire Général, et transmettre à vos Collègues l'expression de nos sentiments de haute considération.

Le Recteur, Président du Conseil Général des Facultés,
G. CHANCEL.

Le Secrétaire du Conseil Général des Facultés,
J. LÉON SOUBEIRAN.

MONSIEUR JOHN MAISCH, *Secrétaire Général de l'Association Pharmaceutique, à Philadelphia.*

[*Translation.*]

MONTPELLIER, *March 1st*, 1890.

University of France—General Council of the Faculties of Montpellier—Mr. General Secretary: The General Council of the Faculties of Montpellier has decided to celebrate in the month of May next the sixth centenary of the university whose heritage is entrusted to the Council. On October 26, 1289, a bull of Pope Nicolas IV. elevated the Faculties of Law, of Medicine and of the Arts, which had already existed for a long time in our city, into a *Studium generale.* The seventh century of our University has, therefore, commenced in October last, and our commemorative celebration will mark the first year.

No doubt, all who are devoted to science will unite with us in giving all possible eclat to a solemnization in honor of a long course in higher education.

The celebration will take place at Montpellier towards the close of May; the precise date will be announced later. We hope that you will do us the honor of being present. We would request you at the same time to communicate this invitation to the members of your Academy, that the same may be represented at our celebration. We would thank you to inform us, at your earliest convenience, of the names of the delegates who may be appointed.

Please accept, Mr. General Secretary, and convey to your colleagues, the expression of our high consideration.

The Rector, President of the General Council of Faculties,
G. CHANCEL.

The Secretary of the General Council of Faculties,
J. LÉON SOUBEIRAN.

ST. PAUL, MINN., AND PHILADELPHIA, PA., *May* 5, 1890.

Mr. President: The officers of the American Pharmaceutical Association have given their earnest consideration to the invitation with which you have honored this Association, of participating by delegates in the celebration of the beginning of the seventh centenary of the University of Montpellier. We regret that this Association cannot be thus represented at the commemorative exercises of an institution which, during six consecutive centuries, has carried aloft the banner of advanced education. But for the achievements of your renowned institution in the past, we beg you to accept our sincere congratulations, which we desire to couple with the best wishes for the future, that for many centuries to come the University of Montpellier may continue as a stronghold of science, through the labors of her professors and the accomplishments of her scholars.

The undersigned embrace this opportunity of conveying to you, Mr. President, and to your colleagues, the high regards of the members of the American Pharmaceutical Association.

KARL SIMMON, *President.*

JOHN M. MAISCH, *Permanent Secretary.*

To Mr. G. Chancel, Rector, &c., Montpellier.

A communication on trade interests has been received from the St. Paul and Minneapolis Associations, wherein they offer a plan to make warfare on the cutters and all associated evils. This will properly go to the Section on Commercial Interests, before being submitted to the Association for discussion.

At the last meeting, notice was given of an amendment to Chapter IX. of the By-Laws, contemplating that the Sections on Pharmaceutical Education and Pharmaceutical Legislation be merged into one. The consideration of this will be taken up at this meeting.

In conclusion, I would take this opportunity of expressing my thanks to Messrs. Ebert, Bedford, Hallberg, and last but not least, to our worthy Secretary, Prof. John M. Maisch, for the many acts of kindness and valuable assistance they have rendered me in the performance of my duties.

On motion of Mr. Ebert, the President's address was directed to be referred to a Committee of three for the consideration of the suggestions contained therein, to be reported upon at a future session. The chair appointed Messrs. Ebert, Chas. Dohme and Gordon said Committee.

Upon motion, the reading of the roll of delegates appointed to this meeting was for the present dispensed with.

The Secretary of the Council read the names of seventy-eight candidates for membership, whose propositions had been passed upon by the Council, and who, upon motion, were invited to join the Association.

Reports of committees being called for, verbal reports were made by Mr. Bedford, for the Committee on Arrangements; by Mr. Eliel, for the Committee on Visit to National Wholesale Druggists' Association; by Mr. Ebert, for the Committee on Revision of the Pharmacopœia; and by Mr. Diehl, for the Committee on National Formulary. Reports by the Committee on Prize Essays, and on Visit to the American Medical Association, were read by title, and for the present laid upon the table.

Mr. Alexander presented the following, which, under the rules, lies over to a subsequent session:

Resolved, That Chapter IX., Article XI., Section 7, of the By-Laws be amended by striking out the words, "who are not delegates."

Mr. Ebert desired Mr. Alexander to include in his notice also an amendment to the same section, contemplating from each State the appointment of one member (instead of two) on the Nominating Committee. Mr. Alexander declined to accept the suggestion.

The appointment of the Nominating Committee being next in order, a recess was taken for five minutes for consultation among the members present, after which the following appointments were made for the respective States:

Alabama: P. C. Candidus, E. P. Galt.
Arkansas: W. L. Dewoody, E. R. Goodwin.
Connecticut: C. A. Rapelye, F. Wilcox.
Dist. Columbia: J. R. Walton, J. A. Milburn.
Delaware: J. S. Beetem.
Florida: S. P. Watson, H. C. Cushman.
Georgia: H. R. Slack, Jr., John Ingalls.
Illinois: A. E. Ebert, C. S. Hallberg.
Indiana: J. N. Hurty, F. W. Meissner.
Iowa: Rosa Upson.
Kansas: L. E. Sayre.
Kentucky: W. H. Averill, Wiley Rogers.
Louisiana: A. K. Finlay, F. C. Godbold.
Maryland: W. Simon, L. Dohme.
Massachusetts: J. H. Manning, H. Canning.
Michigan: A. B. Stevens.
Minnesota: Karl Simmon.
Mississippi: J. W. Eckford.
Missouri: H. M. Whelpley, DeL. Haigh.
Nebraska: C. F. Goodman.
New Jersey: G. Mennen, R. J. Shaw.
New York: R. G. Eccles, G. Ramsperger.
North Carolina: F. W. Hancock, W. Simpson.
Ohio: L. C. Hopp, Julius Greyer.
Pennsylvania: C. A. Heinitsh, E. A. Cornell.
Tennessee: A. A. Kleinschmidt.
Texas: L. M. Connor.
Virginia: E. A. Craighill, E. R. Beckwith.
West Virginia: E. Bocking.

The Nominating Committee was completed by the appointment, by the President, from the Association at large, of Messrs. M. W. Alexander of Missouri, R. C. Hattenhauer of Illinois, Jos. L. Lemberger of Pennsylvania, G. F. H. Markoe of Massachusetts, and W. J. M. Gordon of Ohio.

On motion of Mr. Sheppard, the various States were granted permission to fill any vacancy which may occur in the Nominating Committee, it being known that many delegates and members had expected to be present at the first session, but who may possibly arrive in time for the deliberations of the Nominating Committee.

The minutes of the Council were then read by the Secretary of the Council, G. W. Kennedy, and on motion were approved. These minutes give the following information of the transactions of the Council, following its first session which had been reported at San Francisco (see Proceedings 1889, p. 50):

> The Chairman of the Council appointed the following committee to examine the books of the Treasurer, of the Chairman of the Council, and of the Permanent Secretary's account of the National Formulary: Wm. Dupont, James Vernor and Arthur Bassett, all of Detroit.
>
> Owing to the illness of President Painter in January, 1890, the Chairman of the Council, in compliance with the resolution passed at San Francisco (see Proceedings 1889, p. 51), appointed the following Committee on Retrenchment: Henry Canning, Chairman; Henry M. Whitney and Freeman H. Butler, all of Massachusetts.
>
> SECOND SESSION OF COUNCIL.—OLD POINT COMFORT, Sept. 8TH, 9 A. M.
>
> (9 members present.)
>
> The propositions of seventy-eight candidates for membership were examined and ordered to be favorably reported to the Association.
>
> The engagement by the Publishing Committee of Mr. W. E. Carson, of New York, as stenographer for the present meeting, was approved.
>
> On motion of Mr. Sheppard, it was ordered that in the General Rules on Finance, as

printed in the Proceedings, the words "Examining Committee" be changed to "Auditing Committee."

The Treasurer reported—and his action was approved—that the resignation of G. F. Dinsmore had been accepted, in compliance with the vote of Council of June 24, 1889 (see Proceedings 1889, p. 25); also, that the account of Mr. E. W. Brant had been credited with $5 for 1886, it having been satisfactorily shown that said amount had been paid; this item probably closes the long list of enforced credits that the Association has been obliged to give for several years past.

Owing to the impaired health of Mr. Daniel S. Fox, his name was ordered to be placed on the roll of life-members, old style, without the Proceedings.

The names of Leopold Babo, having joined in 1859, and Henry Bower, a member since 1860, both having relinquished their rights to life-membership in 1868, were ordered to be placed on the list of life-members, old style.

The names of members in arrears with their annual dues for three years or more, were ordered to be dropped from the roll, and a list of the same to be published in the next Proceedings.

On motion of Mr. Simmon, it was ordered that hereafter the salaries of the officers of the Association be paid in two equal instalments, one on March 1st, and the second at the expiration of the term of office.

Messrs. Simmon and Hopp were appointed a Committee to adjust an account from the old ledgers.

The following reports were read and referred to the Association:

REPORT OF THE COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association:

GENTLEMEN:—As Secretary of the Committee on Membership I have the honor to present to you my official report. Immediately after my return home from the last meeting, held in San Francisco, the usual invitation was mailed to each one of the one hundred and thirty-two (132) who had been recommended and accepted, to become members of our Association. Of this number eighty-four (84) have completed their membership, which shows a large percentage as compared with former years. There were also thirteen delegates who became members, making a total increase of ninety-seven (97), which number is credited to 22 States, 2 Territories, and Canada.

Since the publication of the Proceedings for 1889, the following gentlemen proposed at the San Francisco meeting have completed their membership:

Hans M. G. Blestren, Eau Claire, Wis.
R. P. Heilman, Emporium, Pa.
Benj. M. Kline, Denver, Col.
Samuel H. Melvin, Oakland, Cal.
Frederick A. Rometch, Chicago, Ill.
Wm. M. Warren, Detroit, Mich.

REPORT OF MEMBERSHIP.

Members in good standing at last report		1373
" elected since last report		84
" received as delegates		13
Total membership		1470
Loss in Membership.		
By resignation	32	
Dropped from the roll for various causes	45	
By death	26	
Total loss		— 103
Number in good standing at this report		1367

Honorary Membership.

Number on the roll at last report	25
Loss by death	1
Number on the roll at this report	24

In the order of divine Providence a number of our esteemed associates have during the year paid the last debt of nature and passed to the bourne whence none return. It is sad to annually record this depletion of our ranks, and to contemplate the fact that one by one the old familiar faces of those we have met so frequently at our meetings disappear. During the year we have lost our esteemed and valued President, Emlen Painter, and others whose activity in the Association has had a marked effect upon the efficiency of our work. It is sad to announce the following long list of names, which have appeared on our rolls for so many years, that after this meeting will appear no more; but I sincerely hope these names will be placed on the rolls in the more beautiful and happier place above.

Dr. Adolf Duflos, Annaberg, Germany.
H. K. Appleton, Boston, Mass.
Walter T. Baker, Philadelphia, Pa.
Paul Balluff, New York.
George Buck, Chicago, Ill.
S. S. Bunting, Philadelphia, Pa.
Wm. A. Brewer, Orange, N. J.
George E. Cook, Port Jervis, N. Y.
Charles H. Cressler, Chambersburg, Pa.
Wm. M. Giles, New York City.
Edward Goebel, Louisville, Ky.
Henry Hawkins, Detroit, Mich.
Rogers Keys, Philadelphia, Pa.
Benjamin M. Kline, Denver, Col.
Fred. H. Masi, Norfolk, Va.
Henry J. Menninger, Brooklyn, N. Y.
L. E. Nicot, Brooklyn, N. Y.
Emlen Painter, New York City.
Moses L. M. Peixotto, New York City.
Ernst Reusch, Brooklyn, N. Y.
Richard B. Saunders, Chapel Hill, N. C.
Henry Schrader, Indianapolis, Ind.
Charles E. Sitton, Portland, Oregon.
S. P. Smith, Newark, N. J.
C. W. Stryker, Philadelphia, Pa.
J. F. Thibodeaux, Thibodaux, La.
Otto S. Weusthoff, Dayton, O.

Professor Adolf Ferdinand Duflos died in Annaberg, Saxony, October 9th, in his 88th year. He was born at Artenay, near Orleans, February 2, 1802, his father being a soldier in the French army. Having lost by death both his parents, his uncle, a surgeon in the French army, took charge of the boy, and during the campaign of 1813 placed him in charge of Dr. Benedict, rector of the lyceum at Torgau, with whom he remained—an orphan without known relatives after his uncle's death. In 1815 he entered a pharmacy at Annaberg as apprentice, remained here six years, and then became assistant in a pharmacy at Breslau where also chemicals were manufactured on a rather extensive scale. While here he wrote his first scientific essay on "the theory of the formation of ether" of which an abstract was published in Buchner's Repertorium (1824) xviii., p. 245, where it is credited to N. J. vi. 1, 305 (probably Trommsdorff's Neues Journal der Pharmacie vi. (1822). After acting for three years as assistant to the Pharmaceutic Institute at the University of Halle, he returned to Breslau in 1833, teaching chemistry at the Classical School (gymnasium), and in 1843, becoming administrator of the University, pharmacy, in which position he founded the Pharmaceutic Institute of the University of Breslau, which he conducted until 1866, when the failing of his eyesight compelled him to resign. The University, in recognition of his valuable services, conferred upon him honoris causa, the titles of Doctor of Philosophy in 1841, and Doctor of Medicine in 1861.

The literary labors of deceased have been very extensive, and were, in part, made public through numerous essays published in various journals, on subjects connected with pharmaceutical, analytical and technical chemistry. Among his larger works may be mentioned the following: Agricultural Chemistry, Pharmaceutico-Chemical Practice, Articles of Food and their Adulteration, Economic Chemistry (jointly with A. G. Hirsch), Pharmacological Chemistry, Detection of Poisons, Examination of Chemical Remedies, and Chemisches Apotheker-Buch (Chemical Book for the Apothecary). The last mentioned work, of which the sixth edition appeared in 1880, was for many years regarded as the best and most practical work in the German language for the study of pharmaceutical chemistry and for use in the laboratory of the pharmacist.

When he vacated his academic chair Duflos retired to Annaberg, where he was first initiated into the art and science of pharmacy, and lived with the descendants of his foster parents until his death. As long as his eyesight permitted he continued his researches and literary work; and when he was no longer able to read his younger friends read to him the journals published in the interest of pharmacy.

Rather few of deceased's papers found their way into the journals of this country, but many American pharmacists were familiar with his writings, and our Association placed his name on the roll of *honorary membership* in the year 1871.

H. K. Appleton, of Boston, Mass., died April 24th, 1890, of typhoid fever. Deceased was born in Boston, Mass., November 8th, 1839, and was, therefore, in his fifty-first year. After completing his school education, he entered the wholesale drug house of Messrs. Weeks and Potter, of Boston, Mass. He remained in their employ a number of years, after which he opened a drug store in East Cambridge, Mass., which he conducted successfully until the year 1877, when he sold it, and opened a new store at No. 257 Columbus avenue, Boston, where he remained until the time of his death. He graduated from the Massachusetts College of Pharmacy in the class of 1877, and became a member of the College the same year. He took great interest in the college work, and was elected Vice President and afterwards Treasurer, which office he held at the time of his death. He leaves a wife, but no children. Deceased became a member of our Association in 1887, at the meeting held in the city of Cincinnati, Ohio.

Walter T. Baker, of Philadelphia, died January 14th, 1890, after a short illness of one week of pleuro-pneumonia, superinduced by an attack of the "grippe." He was born at Gardner, Mass., on May 26th, 1845, and went to Philadelphia at the early age of seven years. Mr. Baker started in business life with M. L. Halloway, Fourth and Market streets, Philadelphia, one of the largest dry goods houses of the day, and learned the business in all its branches. Upon the failure of Mr. Halloway, he continued his connection with the business under Ritter and Claghorn, who succeeded the former in business. In 1866 his mind was turned to pharmacy as a profession, and he entered the store of Dr. John Miller, corner Twelfth and Ellsworth streets. He became a partner of Dr. Miller in 1868, but in 1870 the firm was dissolved, and both he and Dr. Miller went to Peoria, Ill., but whence he soon returned to Philadelphia to engage in the photographic business with Mr. Newhall for a short time. In 1871 he entered the employ of Henry Bower, Twenty-ninth street and Gray's Ferry Road, with whom he remained until 1884. While with Mr. Bower he resumed the study of Pharmacy, and graduated at the Philadelphia College of Pharmacy April 4th, 1876. In July, 1881, he purchased the store at Nineteenth and Oxford streets, and in December, 1884, bought, also, Dr. L. C. Wolff's, Twelfth and Chestnut streets, and conducted both stores until 1887, when he sold the Chestnut street store.

Deceased united himself with our Association at the meeting held in Pittsburg, Pa., in 1885.

Paul Balluff, of New York, was born January 10th, 1826, at Biedlingen, Würtemberg, on the Upper Danube. His father was a prominent pharmacist of that place, and Paul, as well as an elder brother, were assistants of the father, by whom they were carefully instructed in the business. After passing his examination as an assistant, he served as a clerk in some prominent stores in Germany and Switzerland, then passed the higher examination to become proprietor. In 1852 he married, and shortly afterward came to this country. He engaged in the drug business in Brooklyn, and in 1865 bought an interest in the business of John Faber, at Sixth avenue and Thirty-eighth street. In 1867 his former classmate, Gustav Ramsperger, purchased Mr. Faber's interest, and the firm of Balluff & Ramsperger existed until 1873, when, on Mr. Ramsperger retiring from active business, Mr. Balluff continued as sole proprietor. His genial character made him a very desirable companion, and much sought for in many circles; but since the decease of his wife and a daughter he had almost entirely avoided all society, both scientific and festive. He served for many years as a Trustee, and for two years as President of the College of Pharmacy of New York. He held similar positions in the German Apothecaries' Association. As a pharmacist he was unusually well informed on everything pertaining to his calling, and was a good instructor to his junior employes. He leaves two daughters as the survivors of his family. He became a member of our Association in 1870, at the meeting held in the city of Baltimore, Md., and was elected Vice-President in 1873.

George Buck, one of the oldest and best known pharmacists in the West, passed away on the morning of October 3d, 1889, after a sudden turn for the worse in a long-continued illness. Mr. Buck was born in Rochester, England, in 1827, and after serving a regular apprenticeship, attended the school of the Pharmaceutical Society at London, and was accredited a pharmaceutical chemist at Bloomsbury Square. Shortly afterwards he came to this country, arriving in New York in the summer of 1853, where he remained but a short time before going to Chicago, at which place he was engaged as prescription clerk with J. H. Reed & Co., 144 Lake street, then the leading retail druggist in Chicago, remaining in their employ until 1859, when, in partnership with James Rayner, also an employee of Reed & Co., he started a store at 89 Clark street. This store was the first modern dispensing pharmacy in Chicago, its bright show cases and windows and general attractiveness securing for the firm immediate notice. A few years afterwards the branch store, corner State and Madison, was started. Both stores were destroyed in the conflagration of 1871. They were re-established on nearly the same sites, Mr. Buck taking the corner store, and continuing in active charge of it until his death. The travel at this corner is probably exceeded by no other on the continent. The store, not more than 15 feet square, did an enormous business. Thus prominently located for a quarter of a century, Mr. Buck had an extensive circle of acquaintances, including about all the leading citizens of Chicago, who recognized in him a man of sterling character and a thorough and conscientious pharmacist. Mr. Buck, in connection with Mr. A. E. Ebert, in 1871, while President of the Chicago College of Pharmacy, went to Springfield, and succeeded in getting a pharmacy bill through the House of the General Assembly; but, owing to some opposition by members in the Senate, who insisted upon the recognition of medical diplomas, the bill was not pushed. Mr. Buck was a charter member of the Chicago College of Pharmacy, one of its first trustees, and always consented to occupy an official position when his services seemed desirable. In 1872 he received donations of books, chemicals, apparatus, etc., collected by Professors Brady and Attfield, of the Pharmaceutical Society of Great Britain, and tendered to the College, on behalf of the pharmacists of Great Britain, France, Germany and other countries, to be held as a sacred trust, for the benefit of the druggists of Chicago and their successors forever. Deceased was a charter member of the Illinois Pharmaceutical Association, one of its first Vice Presidents, and held many other positions of honor. He was the first President of the Board of Pharmacy, and held this position for five consecutive years. In his demise the community in which he moved for a third of a century has lost one of its best and most useful citizens, pharmacy and the pharmaceutical profession one of their truest friends. Deceased was one of the oldest members of our Association, having joined it in 1860, at the meeting held in the city of New York.

Samuel S. Bunting deceased on the fifteenth of August, 1890, in the 63d year of his age. He was born on the 23d of April, 1828, at No. 915 Spruce Street, in Philadelphia. His family were among the early Quaker settlers of Pennsylvania, who, since their arrival from England, have been residents and land-owners for several generations near Darby, in Delaware County. When Samuel was quite a child, his father removed to the old family home at Darby, where Samuel resided until he came to Philadelphia, in 1845, at the age of 17 years, as an apprentice to the drug and apothecary business, with Joseph C. Turnpenny, at the northeast corner of Tenth and Spruce Streets. He graduated at the Philadelphia College of Pharmacy, in the class of 1849–50. He was married in 1857 to Anne H. Hibberd, of Upper Darby, at the house in which he afterwards departed from this life. About the time of his marriage he became a partner in business with Mr. Turnpenny, and in 1864 purchased his interest and conducted the store in his own name. He became a member of the Philadelphia College of Pharmacy in February, 1855, and in March, 1856, was elected to its Board of Trustees, serving in that capacity until his decease. In September, 1871, he was chosen Treasurer of the College, and continued to hold that position until November, 1889, when failing health caused him to present his resignation.

In the summer of 1860 he met with an accident: by the sudden displacement of the stopper of a large bottle of concentrated ammonia water, a portion of the liquid was thrown into his face, inflicting an injury which threatened a total loss of his sight. From this accident he suffered during the remainder of his life; although recovering in a fair measure his sight, it was never entirely restored, and the nervous shock received told upon his constitutional vigor during the remainder of his life.

In June, 1886, he retired from business, and lived a quiet life at his home in Delaware County, but continued to manifest an active interest in the affairs of the College. In 1889, his health failed rapidly until the peaceful ending of his life in August last.

Mr. Bunting was a man of sterling integrity and faithful in the performance of his duties; but of unassuming manner, his diffidence and modesty obscuring his real worth to those not well acquainted with him. He became a member of this Association in 1857.

William A. Brewer, of South Orange, New Jersey. This venerable and excellent man passed away on Friday, April 11, 1890, at the age of 83 years. His early home was Boston, Mass., where he was identified with the drug business from youth until 1870, when he retired from the wholesale drug business, which, with his brother, he had conducted with honor and success for many years. His connection with the Massachusetts College of Pharmacy was from its inception, and he was one of its warm friends during his business career. For some years he was with the firm of W. H. Schieffelin & Co., but retired from all business in 1884. He was elected President of our Association at its second annual meeting, held in Boston in 1853, and during its earlier years was an active worker for its interests, contributing several valuable reports. During 1884 he contributed a series of very interesting articles which appeared in the Pharmaceutical Record under the title of "Recollections of an Old Pharmacist." He was a noble character, and his faculties were preserved to old age; he lived a useful, honorable life, and to many a one he was helpful both for this world and the joys beyond. Deceased became a member of our Association at its organization.

George E. Cook, of Port Jervis, N. Y., died there in August last, of cancer of the stomach. Mr. Cook was born July 15th, 1835, near Brooklyn, L. I., and he was, therefore, in the 55th year of his age. He entered a drug store as an apprentice over 33 years ago, and served for seven years with G. W. Raymond, of Peekskill. After this he formed a partnership with Mr. Myers, and under the firm name of Cook & Myers conducted a fine drug store at Tarrytown for nearly five years. He went to Port Jervis 22 years ago, opening a store in Creegan's block, and finally moving to the large and handsomely fitted up establishment which he occupied at the time of his death. Mr. Cook held many positions of trust and honor, and during his long residence in Port Jervis enjoyed the fullest respect of his fellow citizens, and took an active and intelligent part in the welfare of the village. His death was a severe blow to his family, to whom he was greatly attached. His wife, who survives him, and to whom he was married 26 years ago at Cornwall, was Miss Kate J. Bloomer; he also leaves five children—3 daughters and two sons. Mr. Cook connected himself with our Association in 1872, at the meeting held in the city of Cleveland, O.

Charles H. Cressler, of Chambersburg, Pa., died of pneumonia, aged fifty-two years. Mr. Cressler was born in Southampton township, near Shippensburg, where he received his early training. When a youth of sixteen he went to Chambersburg to learn the drug business, first under Jacob Spangler and later under William Heyser. He graduated at the Philadelphia College of Pharmacy with high rank, and clerked for several years at Brown's and at another large drug store in Philadelphia. Upon his return to Chambersburg he formed a partnership with William Heyser in the drug business, on the corner of Main and Queen streets, where Mr. Cressler's store now stands. There they were burned out, and Mr. Cressler purchased from his partner what little of their stock was left, and started up again in the building owned by the late David Piper on South Main street. He also had his store for a short time in a temporary building on Second street, but soon removed to the present location, where he has ever since conducted a prosperous business. Mr. Cressler was well known all over his native state as a competent and honest pharmacist. He was a great student, had a remarkable memory, and was thoroughly acquainted with every department of his profession and business. He was President of the Pennsylvania State Pharmaceutical Association in 1884 and 1885. He was a member of the Chambersburg School Board for many years and Treasurer of it for seven years, and took a deep interest in the public schools. Mr. Cressler is survived by his wife, who was Miss Jennie Jones, of Philadelphia, and by four daughters. Deceased became a member of our Association in 1868, at the meeting held in Philadelphia, Pa.

Dr. Wm. M. Giles, of New York City, died at his residence on Thursday, December 4th, 1889, at the age of sixty years. He was a native of Ireland, and came to this country in 1846. In 1854 he opened a pharmacy on the corner of Sixth Avenue and Thirteenth Street in New York, which proved highly prosperous. For the past eight years Dr. Giles has had charge of the drug department of Thurber, Whyland & Co. He was a member of the New York College of Pharmacy, and took a warm interest in its affairs. He was elected President of the Excelsior Savings Bank, which office he held with credit to himself and satisfaction to the directors. Dr. Giles was possessed of a thorough classical education, was gifted with an excellent memory, and was a most successful raconteur. He was always keenly in sympathy with young men who had their own fortunes to make, and has assisted many in laying the foundation for a successful career. Dr. Giles was elected a member of our Association at Detroit, in 1888.

Edward Goebel, of Louisville, Ky., died in Salt Lake City, Utah. He was well prepared as a pharmacist, and was acknowledged by those best acquainted with him to be very skillful in his profession. His remains were brought to Louisville, and buried from the College of Pharmacy, in which institution he had served as Professor of Materia Medica and Botany. Deceased's membership in our Association dates from the Milwaukee meeting in 1884.

Dr. Henry Hawkins, of Detroit, Mich., was born in Gloucestershire, England, in the year 1845, and came to America in 1874, having studied chemistry some years previous under a member of the Pharmaceutical Association of Great Britain. He first started in business for himself in Detroit in 1874, and later studied medicine, of which he became a graduate, and was a successful practitioner. He was a man of superior education, and was greatly missed by a large circle of friends and acquaintances, among whom he was greatly liked for his friendly and hospitable disposition. He died very suddenly of pneumonia on March 9th, 1890, after being sick but a few hours, having previously suffered from influenza. He leaves a widow and three children, two sons and a daughter, who mourn his loss. He was a member of the Michigan State Pharmaceutical Association, and joined our Association in 1880, at Saratoga Springs, N. Y.

Roger Keys, M. D., died at his late residence 324 South Twelfth street, Philadelphia, Pa., on Tuesday, June 10th, 1890, in the sixty-first year of his age. He was born in Ireland in 1829, and came to this country when a lad. He studied medicine and graduated from the Albany Medical College, and shortly moved to the city of Philadelphia and located at the corner of Twelfth and Pine streets, where he conducted the drug business and practice of medicine, and succeeded in building up a good business as well as a good practice. He was of a genial and social disposition, and had many friends among the physicians and druggists of the city. He was a member of the Philadelphia College of Pharmacy, Pennsylvania Pharmaceutical Association, and Philadelphia Drug Trade Association. He leaves a widow and two daughters and two sons. Dr. Keys became a member of our Association at the meeting held in Philadelphia, in 1868.

Benjamin M. Kline, of Denver, Colo., was killed by being thrown from a street car in Denver last March. Mr. Kline was born in Central City, Colo., in 1866, and was but twenty-four years old when he died. Deceased graduated from the High School in Denver with honors at the age of sixteen, and shortly after he entered upon the study of pharmacy. A few years ago he began business for himself at Broadway and Nineteenth streets, and has continued there since. His business was prosperous, and he had but just returned from Chicago, where he had purchased a $3000 fountain and new fixtures, with the contemplation of entirely remodeling his store. Mr. Kline was held in high esteem, and there was probably no young business man in Denver who had more friends. He was an excellent pharmacist, and stood high among his business associates. Deceased became a member of our Association last year, at the meeting in San Francisco.

Fred. H. Masi, of Norfolk, Va., died there in August last. He was born in Norfolk, Va., and when he died was 44 years old. After serving as an apprentice to the drug business, Mr. Masi started for himself in his native city and continued doing business there until his death. He was buried in Washington, D. C., in the old family lot. On May 1st, 1889, he entered into partnership with his brother Walter, under the firm name of F. H. Masi & Bro. Deceased was the originator and one of the most active workers in the Norfolk and Portsmouth Pharmaceutical Association, to which he contributed largely in books, pharmaceutical preparations and crude drugs, and it stands today a monument to his energy and devotion to his profession. In his domestic relations, that he was dutiful as a son is evidenced by the affectionate pride with which his aged and respected father and his loving mother watched and felt deservedly proud of his every step in life. As a husband and father he was loving, devoted, affectionate and kind. His habits of life were exemplary in the highest degree. As a business man he was active, industrious and full of energy, and as a result was successful and prosperous. Mr. Masi's connection with our Association dates from 1873, at the meeting held in Richmond, Va.

Dr. Henry J. Menninger, of Brooklyn, New York, was born at Metz, on the Rhine, in 1838, and with his parents came to this country in 1850. His father was a prominent member of the German Parliament, and his pronounced views led him to seek a more congenial home. Dr. Menninger attended the public schools in New York City, and later he entered a drug store where he learned the business, after which he purchased a drug store and attended the Medical Department of the New York Uuiversity, where he graduated. Afterwards he was connected with the press as editor, and published the Newbern *Republican* in Newbern, N. C. In 1873 he returned to New York city and subsequently located in Brooklyn, where he conducted the drug business until his decease. He served as alderman and also as coroner in Brooklyn.

He attended most of the meetings of our Association, and served on many committees, was a member of the Council, and in 1886 was First Vice-President, and in 1887 acted as President at the opening of the annual meeting. He became identified with the College of Pharmacy of New York city, and for many years served as one of its Vice-Presidents, and most of the time as Chairman of the Examining Committee. He was a member of the Kings County Medical Society, the Kings County Pharmaceutical Association, and the German Apothecaries' Society. He was also a trustee of the German Savings' Bank of Brooklyn. For the last two or three years his health was poor, and finally rheumatism afflicted him. It was this ailment, which attacked the heart, that after two weeks' sickness ended with his death. Dr. Menninger was a genial friend, an earnest worker, very considerate of others, and his decease will sadden many hearts, especially members of our Association. Deceased became a member of our Association in 1866, at the meeting held in Detroit, Mich.

Louis E. Nicot died at his home in Brooklyn, October 31, 1889, at the age of forty, after a few months of illness, mainly due to exposure to the inclement weather of March 4, 1889, when in Washington, D. C. Mr. Nicot was related to, and had his first education in pharmacy from Mr. L. Sautter, of Albany, and later was a clerk with P. W. Bedford, New York city. He then went to Brooklyn, where he engaged in business on his own account. He was prominently identified with the Kings County Pharmaceutical Society, New York State Pharmaceutieal Association, and was President of the Kings County Board of Pharmacy. Mr. Nioct became a member of our Association at the meeting held in 1875.

Emlen Painter.—The tidings of the death of the President elected at San Francisco, in June, 1889, came with saddening shock to his host of friends and acquaintances. After long and wearying illness, attended by great suffering, he laid down life's burdens, passing away at his home at Spuyten Duyvil, N. Y., January 10th, 1890.

Emlen Painter was born at Concord, Delaware county, Penna., in 1844. His parents, Darwin and Sarah B. Painter, were prominent members of the Society of Friends or Quakers, and Emlen was educated at the Friends' College, in Wilmington, Delaware. In 1864 he matriculated at the Philadelphia College of Pharmacy, and graduated with honors in the class of 1866. After graduation he determined to seek his fortune in the West, and arrived in San Francisco in 1867. He soon received a position of trust in the establishment of the late H. P. Wakelee. The following year, in conjunction with Mr. Calvert, a fellow druggist in the same house, he purchased the business of the late Mr. Hinkley, at the corner of Clay and Kearney streets, and carried on a successful business under the firm-name of Painter & Calvert. A few years afterwards they purchased an additional store, at the corner of Fourth and Howard streets. The partnership expired in 1877, and an amicable division was made, Mr. Calvert taking the Fourth and Howard streets store, and Mr. Painter that at Clay and Kearney. But though the trade partnership expired, the most cordial friendship continued till the latter's decease.

Mr. Painter soon branched out and established other stores, one at the corner of California and Kearney streets, and another at Eleventh and Mission streets. After a short time he arranged a laboratory at the rear of the latter place for the manufacture of chemicals, which in a few years increased to such proportions that he was obliged to look out for larger quarters for his laboratory. But it is in connection with the founding of the California Pharmaceutical Society and the College of Pharmacy, that his name and fame became identified with the history of the Pacific coast. The need of a proper school for training and educating the young pharmacists became apparent to Mr. Painter's inquiring mind soon after his arrival; the distance from eastern colleges being too great to take advantage of their resources, the young pharmacists of the Pacific coast were placed at a great disadvantage in comparison with their eastern brethren. To correct this state of affairs engaged Mr. Painter's attention. A few pharmacists whom he interested in the matter and who saw the wants of the coast, came together, and after much time and money spent, organized the California College of Pharmacy. Like all young institutions it had serious obstacles to surmount, which tried the patience and resources of the founders. But Mr. Painter's motto was *nil desperandum*, and he infused a spirit and life into the organization that overcame all difficulties. In addition to the onerous and trying duties of acting as Trustee and Dean of the Faculty, he also gave his services as Lecturer on Pharmacy without fee or reward of any kind for several years, and at great personal sacrifice of his private business, till the institution was placed on a basis that would allow of some compensation.

He then resigned the chair, but still continued to act as Dean, and devoted a great deal of time to the institution. The college was in rented quarters, but it prospered so well that in a few years a lot was bought in the centre of the city, and the present college erected. To obtain funds for the purchase of the site and erection of the building was a stupendous undertaking. As usual, Mr. Painter, true to his motto, began the labor of financiering. His efforts were untiring, until finally his energy, determination and persistent labors were crowned with success, and he had the satisfaction of seeing the child which he nursed develop into a strong youth, and from youth into healthy manhood. Mr. Painter's health began to fail him, and he returned east to his old home in Pennsylvania, to obtain rest which he very much needed, and during his stay east decided to make New York his future home. He purchased the pharmacy of the late John Sheddon, at Broadway and Thirty-fourth streets; under his management the business soon began to treble, and it became necessary to enlarge the premises. His zeal and intelligence were quickly recognized and appreciated in New York city. He was elected a Trustee of the New York College of Pharmacy, and Chairman of the Board of Examination. He was one of the editors of the National Formulary, and was chosen a delegate to represent the State of California at the next revision of the United States Pharmacopœia. Deceased contributed many valuable articles to the Journals, and to the California Pharmaceutical Society; and the papers read by him at our meetings, one of which obtained the Ebert prize a few years ago, gave his name a national prominence. During the long trip homeward from the last meeting, Mr. Painter had a severe attack of bronchial trouble, and despite surgical treatment and careful attention, was incapacitated for business. It was deemed necessary that he go to a warmer climate to recuperate, which all his friends hoped was a question of but a short time. He had disposed of his business, and, attended by a friend, had started South in search of rest and strength, but increasing feebleness warned him that the end was near; he had but barely time to reach his home, when the final summons came. He leaves a wife and five children to mourn his loss. Mr. Painter was elected a member of our Association at the meeting held in Baltimore, in 1870.

Moses L. M. Peixotto, of New York, died there September 6th, 1890. Deceased, after receiving a good common school education, began the study of pharmacy, and after being thoroughly prepared in the various branches connected with the profession of his choice, he began business for himself. He was reliable as a pharmacist, and was highly respected in the community in which he resided. He served as Trustee, and also Secretary and Vice-President, of the New York College of Pharmacy, in whose success he always took a warm interest. Mr. Peixotto, up to a few years ago, when his health began to fail, was a regular attendant at the meetings of our Association, and no doubt will be remembered by the older members. Deceased became a member of our Association in 1859, at the meeting held in the city of Boston.

Ernest Reusch, of Brooklyn, New York, died suddenly at his home June 20, 1890. He was a very intelligent pharmacist, and, owing to his energy and industrious habits, had succeeded in establishing a prosperous business. Mr. Reusch became a member of our Association in 1882, at the meeting held in Niagara Falls, N. Y.

Richard B. Saunders died in Raleigh, N. C., at which place he was born on the 12th day of April, 1834. With his parents he went to Pensacola, Fla., in 1836, and in 1839 his father died of yellow fever. In the spring of 1840 Richard and his mother returned to Raleigh, where they lived until the summer of 1850, when he entered the University at Chapel Hill, from which institution he graduated in June, 1854. During his course at the University he developed a great fondness for the science of chemistry, and was very diligent in its study, whereby he became a great favorite with the professor in that department. Not content with the regular college course, he remained in the laboratory with Prof. Mitchell, and took a post-graduate course. His fondness for chemistry continued during his life. In 1855 he purchased the drug store at Chapel Hill, which he conducted with success for several years. In 1866 he removed to a plantation near Raleigh belonging to his mother, where he experimented for several years in what was called scientific farming. He also became connected with a newspaper published in Raleigh, and contributed valuable articles on agricultural subjects. The manufacture and trade in commercial fertilizers, and the impositions practiced therein, soon attracted his attention, and he became mainly instrumental in establishing the Bureau of Agriculture, urging its necessity, not only in the public press, but before the Legislature. In 1880 he entered the service of the Canton Chemical Company, which firm manufactured commercial fertilizers. In 1881 he became Superintendent of the Upsher Company, also manufacturers of commercial fertilizers, with whom he remained until the works were destroyed by fire. He then entered a similar establishment in the same capacity, where he remained until 1889, when his health became so bad that he had to abandon business altogether. After lingering about eighteen months, he died on the 6th of September, 1890, from a complication of diseases.

Deceased became a member of our Association in 1858, at the meeting held in Washington, D. C.

Henry Schrader, of Indianapolis, Ind., died there August 28, 1889. Mr. Schrader was born in Indianapolis in the year 1840. He began the study of pharmacy by entering the drug-store of Messrs. Craighead and Browning in the year 1854, where he remained until the fall of 1861, when he entered another business, in which he continued for several years, after which he again returned to the drug business, and remained in it several years longer; the confinement and long hours were telling upon his health, and he left the drug business and joined his brother in the grocery trade. Mr. Schrader was a careful and studious reader, had an excellent memory, and enjoyed scientific discussions. He was not an attendant upon the meetings of our Association, but never lost an interest in the profession of his early life. Deceased was elected a member of our Association in Chicago, Ill., in 1869.

Chas. E. Sitton, of Portland, Oregon, died there recently, after a brief illness. Many years ago he located in Portland, and went into business for himself, being one of the pioneers of the State. He invested nearly all the money he made in real estate, which soon became valuable, and at the time of his death he was worth about $500,000. Mr. Sitton became a member of our Association in 1878, at the meeting held in Atlanta, Ga.

Israel P. Smith, of Newark, N. J., was born in Newark, N. J., May 16th, 1848. He began the study of pharmacy when a boy in the store of C. W. Badger, where he served several years, after which he clerked in several stores as senior clerk, and finally in 1874 purchased the business on Bank street, where he has continued ever since. He was an active member in the Newark and New Jersey Pharmaceutical Associations. He loved his business and was successful in it. At the time of his death, which occurred on Saturday, April 17th, 1890, he owned two stores and also a branch at Orange Valley, N. J. He was a careful and conscientious apothecary, worked early and late, and was wide awake to the progress of the times. Deceased became a member of our Association at the "Centennial" meeting in 1876, in Philadelphia, Pa.

Cornelius W. Stryker, of Philadelphia, was born at Somerville, N. J., in September, 1859. His early years were spent at boarding school, and he afterwards became a student at Rutgers College, from which he graduated when about twenty years of age. Afterward he went to Philadelphia and entered Wilmer's drug store, where he learned the business, graduating at the Philadelphia College of Pharmacy in 1882. The next two or three years were passed at Blair's and Borell's pharmacies, and in December, 1885, upon his return from an extensive tour through the United States, he formed a partnership with Mr. John Ogden, and bought the business of Professor Remington at the northeast corner of Walnut and Thirteenth streets, where he continued up to the time of his death. The immediate cause of his death was pneumonia, caused by an attack of the "grippe." His illness lasted but six days, and he passed away on Monday, February 10th, 1890, aged thirty years. His early death was mourned by the many friends to whom he was endeared by his many good qualities of mind and heart. Deceased became a member of our Association in 1886, at the meeting held in Providence, R. I.

Abel S. Sweet died in Bangor, Maine, at which place he carried on a successful business. He was a man of sterling habits, and won the respect of his brother pharmacists and the residents of Bangor, by his honesty and genial disposition. Mr. Sweet became a member of our Association at the meeting held in 1883, at Washington, D. C.

Joseph T. Thibodeaux died at his home in Thibodaux, La., October 9th, 1889. Mr. Thibodeaux was born in 1844, in the parish of Assumption, La., and when a mere child moved to Lafourche parish, where he has resided ever since. He studied pharmacy under Casanavetti & Co., of Thibodaux, whose establishment he purchased in 1865, and conducted until his death. In 1882, he organized the Louisiana State Pharmaceutical Association, and was the President for the first two years. In 1888, he was, on the unanimous recommendation of the Association, appointed a member of the State Board of Pharmacy, which body chose him as its President by acclamation. This position he held at the time of his death. Mr. Thibodeaux was prominent as a citizen, as well as a pharmacist, and was specially interested in fraternal associations, in several of which he was a leading spirit. In 1870 he was elected a member of our Association at Baltimore, Md.

Otto S. Weusthoff, of Dayton, Ohio, died in Dayton, of cerebral hemorrhage. He was born in 1855, and was thirty-five years old when he died. He studied pharmacy at an early age, and graduated from the Cincinnati College of Pharmacy with high honors, receiving the gold medal as a reward for being the best scholar. He started in business for himself twelve years ago, which he continued up to the time of his death. Deceased became a member of our Association in 1879, in Indianapolis, Ind.

Gentlemen, in concluding my report, please accept my thanks for favors extended me during the past year.

GEO. W. KENNEDY,
Secretary Committee on Membership.

DETROIT, MICH., *July* 25, 1890.

To the Chairman, Officers and Members of the Council of the American Pharmaceutical Association:

GENTLEMEN:—Your Committee appointed to examine the invested funds and cash in the hands of the Chairman of the Council, respectfully report that they have examined the books, bonds and savings bank account, and find the "Ebert," "Centennial," and "Life Membership" Funds correct and in accordance with the accompanying report of the chairman, Mr. J. M. Good.

Respectfully submitted,

WM. DUPONT, *Chairman*,
JAMES VERNOR,
ARTHUR BASSETT,
Examining Committee.

St. Louis, Mo., *July 1st*, 1890.

The invested funds in the hands of the Chairman of the Council consist of the following:

EBERT FUND.

U. S. Registered 4% Bond $100, No. 160603	$121 50
“ “ $500, “ 67880	607 50
Cash, Savings Bank, Dover, N. H.	35 98
	$764 98

CENTENNIAL FUND.

U. S. Registered 4% Bond $1000.00, No. 145640	$1215 00
“ “ 100.00, “ 160604	121 50
Cash, Savings Bank, Dover, N. H.	122 54
	$1459 04

LIFE MEMBERSHIP FUND.

U. S. Registered 4% Bond $1000.00, No. 145639	$1215 00
“ “ 1000.00, No. 145761	1215 00
“ “ 1000.00, No. 145762	1215 00
“ “ 100.00, No. 160605	121 50
“ “ 100.00, No. 160606	121 50
“ “ 100.00, No. 160711	121 50
“ “ 100.00, No. 160712	121 50
“ “ 100.00, No. 160713	121 50
“ “ 100.00, No. 160714	121 50
“ “ 100.00, No. 162830	121 50
“ “ 1000.00, No. 150826	1215 00
“ “ 1000.00, No. 150827	1215 00
“ “ 1000.00, No. 150828	1215 00
“ “ 100.00, No. 164429	121 50
“ “ 100.00, No. 164430	121 50
“ “ 100.00, No. 164431	121 50
“ “ 100.00, No. 165415	121 50
Cash, Savings Bank, Dover, N. H.	943 94
	$9570 44
Total invested funds	$11794 46

J. M. Good.

Detroit, Mich., *July* 25, 1890.

To the Chairman, Officers and Members of the Council of the American Pharmaceutical Association.

Gentlemen:—The Committee on Finance would respectfully report that the books of the Treasurer show the financial condition of the Association to be as follows:

Received from sale of Proceedings, and National Formulary, from annual dues, and interest on money deposited in bank, from May 1st to July 1st, 1889	$1319 49
Cash on hand May 1st, 1889	2946 45
	$4265 94

Disbursed. From May 1st to July 1st, 1889 (see page 26, Proceedings 1889)	$1207 03
Cash on hand, July 1st, 1889	$3058 91
Received from sale of Certificates, Proceedings and Badges; Ebert Fund, Interest on money in bank, Life Memberships, annual dues, etc., etc., from July 1st, 1889, to July 1st, 1890	6227 50
From sale of National Formulary	1224 98
	$10511 39
Paid out for Salaries, Stationery, Postage, Express, Hall Rent, Printing, Stenographer, etc., etc., from July 1st, 1889, to July 1st, 1890	6370 82
Cash on hand, July 1st, 1890	$4140 57
Invested funds	$11794 46

Respectfully submitted,

Wm. Dupont,
James Vernor,
Examining Committee.

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1889 TO JULY, 1, 1890.

RECEIPTS.

Cash on hand, July 1st, 1889		$3058 91
Received from the sale of 10 Certificates @ $5.00		50 00
Received from the sale of 12 Certificates @ $7.50		90 00
Received from the sale of Proceedings		68 60
Received from the sale of Badges		12 50
Received from estate of G. J. Luhn		3 60
Received from the Ebert Fund		24 00
Received for Interest on Deposit in New England Trust Company, Boston.		93 89
Received for Life Membership Fees, viz:		
John H. Zeilin	$20 00	
John A. Milburn	20 00	
Robert H. Land	20 00	
		60 00
Received for Annual Fees, 1885.	$10 00	
Received for Annual Fees, 1886.	25 00	
Received for Annual Fees, 1887.	60 00	
Received for Annual Fees, 1888.	140 00	
Received for Annual Fees, 1889.	3475 00	
Received for Annual Fees, 1890.	2110 00	
Received for Annual Fees, 1891.	5 00	
		5825 00
Received from sale of National Formulary		1224 98
Total Receipts		$10511 39

DISBURSEMENTS.

1889.					
July	8.	Check No. 135.	H. M. Whelpley, stationery and postage		$ 13 78
		Check No. 136.	Robert J. Brown, Committee on Arrangements		6 50
		Check No. 137.	Emlen Painter, Committee on Scientific Papers	$28 31	
			Committee on Arrangements	61 35	
					89 66

July	8.	Check No. 138. John M. Maisch, traveling expenses		$205 00
	30.	Check No. 139. Stephen Potter, services as stenographer		50 00
		Check No. 140. Odd Fellows' Hall Association, rent of Hall at San Francisco		25 00
August	5.	Check No. 141. McNeil Brothers, printing of papers, etc		303 95
	9.	Check No. 142. Fred Wilcox, sundry expenses		13 26
		Check No. 143. Stephen Potter, services as stenographer		80 00
		Check No. 144. John M. Maisch, expenses of Local Secretary.		12 10
	17.	Check No. 145. Guarantee Company, of North America, premium on Treasurer's Bond		45 00
		Check No. 146. Winkley, Dresser & Co., stamped envelopes and stationery		23 45
		Check No. 147. Joseph F. Geisler, Ebert Prize		24 00
September	17.	Check No. 148. Standard Publishing Company, printing and stationery		9 75
		Check No. 149. Inquirer Printing and Publishing Company, National Formulary		8 45
October	10.	Check No. 150. Inquirer Printing and Publishing Company, National Formulary		56 00
November	1.	Check No. 151. John Dickson & Co., Proceedings		18 50
	18.	Check No. 152. Standard Publishing Co., stationery		5 50
December	28.	Check No. 153. J. Heidingsfeld, printing and stationery		7 10
		Check No. 154. Winkley, Dresser & Co., stamped envelopes, printing and stationery		117 67
		Check No. 155. Inquirer Printing and Publishing Company, National Formulary		11 15
December	28.	Check No. 156. Inquirer Printing & Publishing Co., Proceedings.		1 75
1890.				
January	21.	Check No. 157. Inquirer Printing & Publishing Company, National Formulary.		78 26
		Check No. 158. John M. Maisch, National Formulary		17 25
		Check No. 159. Williams Printing Company, printing and stationery		5 50
February	3.	Check No. 160. John M. Maisch, Sundry Expenses		379 66
	10.	Check No. 161. Inquirer Printing & Publishing Co., Proceedings.		1956 81
	14.	Check No. 162. Standard Publishing Company, printing and stationery		12 50
	25.	Check No. 163. John M. Maisch, Journals for Reporter on Pharmacy		23 72
	27.	Check No. 164. Joseph W. Colcord, printing and stationery.		4 50
March	12.	Check No. 165. Inquirer Printing & Publishing Co., National Formulary		150 12
	17.	Check No. 166. American Surety Company, Premium on Treasurer's Bond		50 00
June	12.	Check No. 167. George W. Kennedy, salary as Secretary of Council	$50 00	
		Salary as Secretary of Committee on Membership.	150 00	
				200 00
	12.	Check No. 168. Mills, Knight & Company, printing and stationery		75 25

June	16.	Check No. 169. Inquirer Printing & Publishing Co., National Formulary	$22 55
		Check No. 170. John M. Maisch, National Formulary	22 31
		Check No. 171. C. Lewis Diehl, salary as Reporter on Progress of Pharmacy, 1889 to 1890	750 00
		Check No. 172. S. A. D. Sheppard, sundry expenses.	60 97
	23.	Check No. 173. John M. Maisch, insurance and expressage.	23 85
		Check No. 174. S. A. D. Sheppard, salary as Treasurer 1889 to 1890.	600 00
		Check No. 175. John M. Maisch, salary as Permanent Secretary 1889 to 1890.	750 00
October	3, 1889.	Life Membership Fund	20 00
	28, 1889.	" " "	20 00
January	3, 1890.	" " "	20 00
		Total	$6370 82

SUMMARY OF DISBURSEMENTS.

Use of Hall at San Francisco meeting	$25 00
Stenographer at San Francisco meeting	130 00
Secretary's Expenses, Attendance at San Francisco meeting	205 00
Insurance	9 00
Journals for Reporter on Pharmacy	23 72
Premiums on Treasurer's Bonds	95 00
Printing and Stationery	283 85
Committee on Papers and Queries	332 26
Committee on Arrangements	67 85
Miscellaneous Expenses, Mailing and Distributing the Proceedings, Expressage, Agents' Expenses, etc., etc.	471 99
Printing and Binding the Proceedings, Checks Nos. 151, 156 and 161	1977 06
Salaries	2300 00
Amount of Current Expenses	$5920 73
National Formulary	366 09
Life Membership Fund	60 00
Ebert Prize	24 00
	$6370 82
Cash on hand July 1, 1890	4140 57
	$10511 39

STATEMENT FOR THE YEAR.

Current expenses for 1889		$5920 70
Receipts to date for 1889	$5535 00	
1889—Assessments not yet paid, but probably good	160 00	
Deficit for 1889	225 70	
		5920 70

Of the cash in the treasury the sum of $222.33 belongs to the account of the Committee on Arrangements, as per following statement:

ACCOUNT OF COMMITTEE ON ARRANGEMENTS.

DR.

Cash on hand May 1, 1889	$314 15
Interest	6 28
	$320 43

CR.

Bill of Karl Simmon. Check No. 133	30 25
" " Robert J. Brown. " " 136.	6 50
" " Emlen Painter. " " 137.	61 35
Cash on hand July 1, 1890	222 33
	320 43

PROSPECTIVE ASSETS.

Not counting what is due from members whose names will probably be dropped from the roll this year, there is now outstanding on the books of the Association—

Annual dues for 1888	$10 00
" " " 1889	290 00
" " " 1890	3775 00
Total	$4075 00

The item on the list of receipts of $3.60 from estate of G. J. Luhn is a 12 per cent. dividend on the amount due the Association by the estate. It was received December 13, 1889, from G. W. Dingle, Esq., Administrator. In a letter, March 1, 1890, Mr. Dingle states that the estate may possibly yield another dividend of 5 per cent.

E. W. Brant has been credited on the ledger $5.00, 1886 dues, as "By Order of Council," satisfactory evidence having been received that the same has been paid.

Messrs. McNeil Brothers, Printers, of San José, California, owe the Association nine dollars ($9.00), which they have neglected to pay, though the Treasurer has written to them a number of times, urging payment.* They were formerly located in San Francisco, and were employed to do printing for the Association at the time of the annual meeting in that city. Their bill, $303.95, was rendered, approved and paid. Subsequently it was ascertained that nine dollars of the amount charged to and paid by the Association had been paid by the Local Committee in San Francisco.

The Treasurer would especially call the attention of each member of the Association to the alphabetical list of the names of members from whom money has been received during the year. This list is published in the back part of each volume of the Proceedings, and is of more consequence than at first sight it seems to be. I fear that the members do not sufficiently notice it or appreciate its value. It affords each member an opportunity to audit his own account. It is a most efficient check on the Treasurer, as it shows each item that goes to make up the total amounts mentioned in his annual report as received for dues and certificates.

The list also serves the purpose of stimulating the authorized agents to make prompt remittances, as if a member has paid an agent and does not find his payment on the list at the proper time, he can at once notify the Treasurer.

There are also advantages to the Association to be derived from a careful examination of this list by all the members.

Thanking the members for their courtesy during the year, I remain

Very truly, S. A. D. SHEPPARD, *Treasurer.*

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* The Secretary has been informed that the amount was paid since the report was made.

DETROIT, MICH., JULY 25, 1890.

To the Chairman, Officers and Members of the Council of the American Pharmaceutical Association.

Gentlemen: Your Committee appointed by the Chairman of the Council, having examined the books of the Treasurer and Permanent Secretary of the American Pharmaceutical Association, report that we found a discrepancy between the amounts sent to the Treasurer by the Secretary, and those received by the Treasurer, amounting to $163.20. We find this to be owing to the fact that the Secretary had entered an item of $4.40 in the list of moneys sent, which was in reality an excess sent last year, and so reported by your Committee at that time.

The Secretary further enters an item of $126.30 as sent to the Treasurer, which was in reality drafts for collection, and which had not been collected at the time the Treasurer made his report. Further, the Secretary's report covers a period not covered by that of the Treasurer, namely, from May 1, 1889, to July 1, 1889, but by reference to the published Proceedings (page 25) we find the amount of the discrepancy ($32.50), there accounted for by the Treasurer.

With these corrections the accounts stand as follows, and make the books and the reports of the Secretary and the Treasurer agree with each other.

STATEMENT.

Transmitted by the Secretary		$1388 18
Received by the Treasurer		1224 98
Apparent shortage		$163 20
Accounted for as follows:		
Excess of remittance, 1889	$4 40	
Transmitted between May 1 and July 1	32 50	
Drafts for collection	126 30	
		$163 20

Respectfully submitted,

WM. DUPONT, *Chairman*,
JAMES VERNOR,
ARTHUR BASSETT,
Examining Committee.

SUMMARY OF COST AND RECEIPTS FROM SALE OF NATIONAL FORMULARY, FROM MAY 1, 1889, TO JUNE 30, 1890.

I. EXPENSES.

Printing 1000 and binding 1959 copies	$354 38
Expressage, postage, fire insurance	111 39
Total Expenses	$465 77

II. RECEIPTS.

From 21 dealers, not agents	$1223 88
" 11 authorized agents	141 17
" office sales	23 13
Total receipts	$1388 18

III. REMITTANCES TO TREASURER.

Total from May 13, 1889, to June 30, 1890, as per Treasurer's receipts	$1383 78
Excess of remittance to May 1, 1889 (see Proceedings 1889, pp. 14 and 15)	4 40
	$1388 18

IV. BILLS RECEIVABLE.

From 2 authorized agents	$67 30
" 10 dealers, not agents	193 88
	$261 18

V. BILLS PAYABLE.

All bills rendered to date have been paid.

VI. STOCK ON HAND.

Copies in sheets	500
" cloth	236
" cloth, interleaved	212
" cloth, raised nails	26
" sheep	165
" sheep, interleaved	81
Total copies on hand	1220

VII. COPIES FOR MEMBERS.

Sent to members entitled	6 copies cloth.
Value at wholesale price	$3

VIII. RECAPITULATION OF CASH EXPENSES AND RECEIPTS.

1. Cash payments to May 1, 1889 (see Proceedings 1889, p. 15)	$3440 29	
" " to June 30, 1890 (as above)	465 77	
Total cash payments		$3906 06
2. Cash receipts to May 1, 1889 (Proceedings 1889, p. 15)	$4141 12	
" " to June 30, 1890 (as above)	1388 18	
Total cash receipis		5529 30
Total cash profit to June 30, 1890		$1623 24

JOHN M. MAISCH, *Permanent Secretary.*

After the report of the Committee on Membership had been read, President Simmon again alluded to the death of Mr. Painter, and invited remarks upon the deceased from those who had been connected with him.

Mr. BEDFORD: Allusion has been made to our deceased friend, Emlen Painter. A little more than a year ago he was with us, and presided at the closing session of our interesting meeting at San Francisco. Shortly after his return East, his disease took an unfavorable turn, and soon rendered him incapable of attending to business; he lingered only till just after the beginning of the new year, when he passed away. To-day would have been his birthday. He had looked forward to the time when he should meet the members of the Association at this place, with anticipations of great pleasure, which alas! were never to be realized.

It was the intention of your Committee of Arrangements to have had on this platform a crayon portrait of Mr. Painter, which when finished was pronounced by one of his most intimate friends an admirable likeness, but owing to the delay of the Expres Company, it has not been received.

Of the merit of Emlen Painter we all know: of his worth and character you have heard. I can add no words save those of earnest friendship and esteem for him; he was one of the earnest workers of this Association, and by his death we have met with a great loss. A letter received from his widow on Friday last alluded to her great sorrow, and I have a request to convey to her many friends in this meeting her kind remembrance of our trip last year, and the enjoyment that she had experienced in company with many of our members.

Mr. Painter was a man of remarkable activity, of honest, earnest opinions, and when satisfied that he was in the right, he was not to be swerved by motives of either opposition or any other cause. He pursued what he believed to be right to the end. It is an unfortunate fact that many a man who is honest in his business, honest in his intentions, finds the way of life somewhat difficult in the pursuit of satisfactory and remunerative business, and it is a matter of regret that he should have been taken from us leaving his family in comparatively straitened circumstances. Aside from this, I think we all heartily unite in an earnest resolution of our deep sympathy with the widow in this her sorrow. I would ask that an opportunity be given for resolutions to be presented before the meeting at another time.

Mr. Alexander.—Mr. President: It was not my privilege to know Mr. Emlen Painter in the more intimate and social relations of life. I think that from the time he first came to the city of New York he made but very few intimate friends; he was too much engrossed in his scientific pursuits, and in his private affairs to have the leisure, even if he had the inclination, to cultivate the social side of life. I first met Mr. Painter at the annual meeting which was held in Providence some five years ago, and I was impressed with his strong personality and his forcible character. He was a man of ideas, and he never shrank from the defence of his convictions. He had a grand and elevated conception of his personal duties and responsibilities, and he tried to live up to them. He always acted from his sense of right, without regard to prudence or expediency—I hardly think he knew the terms. Hence he was not a popular man in the usual acceptation of the term. He was a man who won his position in this Society more from his earnest and honest work in endeavoring to promote its welfare than from his personal popularity or attributes. My relations with Mr. Emlen Painter were almost entirely of an official character, and, although we had occasion to differ, often radically, as to policy, yet all his intercourse with me was courteous and gentlemanly. When this Association went to San Francisco last year, it was proposed to honor the State of California by electing some one of its pharmacists as the President of the Association, and when the California delegation were approached and several possible names suggested to them of their members, they said, "No; if you wish to honor California we want you to elect Mr. Emlen Painter, for he has done more for the advancement of pharmacy than any other man upon the Pacific slope. He is a member of our College, our Association, and representative of your Association; therefore we want you to elect him, if you wish to honor California." Of course, the point was conceded, and Mr. Emlen Painter was elected President of this Association. After reaching the goal of his ambition—for he was ambitious to be President of this Association: it was an honorable ambition and worthy the aspiraation of any of its members—he was permitted to fulfil his duties but a very short time. Soon after my return from California I received a letter from Mrs. Painter, in which she stated that Mr. Painter was seriously ill with nervous prostration, produced by overwork and anxiety, and she also said that she felt very keenly some of the criticisms that had appeared in some of the drug journals. Now, while Mr. Painter was a fearless and aggressive man, he was peculiarly sensitive to adverse criticism, particularly where he thought his motives were impugned. Mrs. Painter also stated that an operation had been performed on his throat, which it seemed would be successful, and they had hopes that in a very short time he would be well again, and able to resume business duties. But their hopes were doomed to disappointment. Mr. Painter grew worse and more feeble until the end came. Mr. Painter is dead, but he leaves behind him a memory that will be a benefit and a force of inspiration to the members of this Association to emulate his example in sustaining and raising the standard of pharmacy in this country. Mr. President, I don't know that I can say more, and I would only be false to my sense of propriety if in my tribute of respect to his memory I should have said less of one who was my immediate successor in office.

SECRETARY MAISCH: Professor Remington, who is present, will, no doubt, add some words to what has been said regarding Mr. Painter. He was a classmate of our late President, having attended at the same time the College of Pharmacy and graduated with him. I rose mainly for the purpose of stating that the officers of this Association endeavored to honor the memory of Mr. Painter as much as was in their power by attending him to his last resting-place. On that occasion there were present three of the ex-Presidents of the Association, Messrs. Bullock, Bedford and Shinn, the Secretary of the Council, Permanent Secretary of the Association, an old member of the Association, the President of the Board of Pharmacy of Pennsylvania, Mr. Robbins, and Professor Remington, formerly Chairman of the Council.

MR. REMINGTON: Mr. President and Gentlemen: I feel very sad, indeed, in the contemplation of the event we are all thinking of at the present time. Mr. Alexander has so thoroughly and intelligently spoken of my friend that I feel that what I have to say will be but a reiteration of what he has already said. It may be of interest to some of us to know that Emlen Painter was a student of the Philadelphia College of Pharmacy, and graduated in 1866. Professor Sayre was also a member of the same class. After Mr. Painter graduated he came to me as a friend—we were quite intimate—to know what he should do now that he had a diploma. I had some friends in San Francisco, and then, as now, the feeling was that young men should go west if they wished to succeed, and I gave him letters to them, advising him to go westward. He went there, traveling by sea, across the Isthmus—at that time we did not have the Pacific Railroad—and I learned, soon after, that he had established himself in San Francisco, first as a clerk, and subsequently as a proprietor, having an interest in a store. His career in San Francisco was marked by the same strong characteristics that we have had explained here by Mr. Alexander. Emlen Painter was a man who never thought for a moment of the future. The future to him was something that would take care of itself. He was unflinching in the discharge of what he regarded as his present duty. As a boy and as a young man he was conscientious as he was in after life, noble and self-sacrificing to a degree. I rarely have seen a more sturdy character, and it gives me a great deal of pleasure, before all of you gentlemen, who knew him so well, to say to you that in Emlen Painter's heart there was no guile. He was one of the purest men it was ever my privilege to know, and I knew him intimately, and many of the aspirations and feelings which actuated him he freely expressed to me. He had, it is true, some ambition; but his ambitions were of the noblest kind, and he had the kindest feeling for men who he thought had injured him. We have, I feel, lost a power in this Association. We have but few men of that stamp in the world—not only in this Association, but in the world—too few entirely; and I feel sad, indeed, to think that after reaching the highest point, the goal of his ambition, he was unable to see the time when he could be with us here and assume the position which I know all of us would have loved to see him filling, that of presiding over our deliberations.

The reports of the Auditing Committee, of the Chairman of Council (see page 19), of the Treasurer (see page 20), and on the sales of the National Formulary (see page 24), were read and referred for publication.

MR. REMINGTON.—This report should not pass without some comment, as there are some very interesting figures mentioned in it, showing a condition which is very encouraging to the work of the National Formulary Committee. There have been over five thousand five hundred dollars received from the sale of that work, and over sixteen hundred dollars turned into the treasury as net profit, besides giving to each one of our members a free copy and to the pharmacists throughout the United States the benefit of this National Formulary.

The following report was read by Mr. Remington:

REPORT OF COMMITTEE TO VISIT AMERICAN MEDICAL ASSOCIATION.

To the American Pharmaceutical Association.

GENTLEMEN:—Your Committee who were appointed to visit the American Medical Association respectfully report that two of the members visited Newport, R. I., at the meeting held in June, 1889. After consultation with a number of physicians who were favorable to the establishment of closer relations between the two professions, it was deemed best to endeavor to create a friendly feeling for the movement through personal discussion rather than through a public address; this course was followed industriously, and nearly all of the prominent members of the American Medical Association expressed themselves as warmly in favor of closer relations, and also of the step taken by the American Pharmaceutical Association in issuing the National Formulary. Your Committee have great pleasure in reporting that the American Medical Association, at its last meeting, in Nashville, decided to create a Section in Pharmacy, which shall have the same privileges as the other Sections of the Association. This action has been consummated, Dr. Frank Woodbury of Philadelphia having been elected Chairman, and Dr. W. G. Ewing of Tennessee Secretary.

Respectfully submitted,

JOSEPH P. REMINGTON, *Chairman,*
CHAS. A. HEINITSH,
KARL SIMMON,
W. M. MASSEY,
WM. H. COTTON.

AMERICAN MEDICAL ASSOCIATION, PHILADELPHIA, *September* 2, 1890.

TO PROF. REMINGTON:

The following is the action creating the new Section:

Resolved, That the words Materia Medica be taken from the title of Section I., and that a new Section be formed, to be entitled the "Section on Materia Medica and Pharmacy," to have the same privileges as other Sections of this Association.

DR. F. WOODBURY, Pa., *Chairman.*
DR. W. G. EWING, Tenn., *Secretary.*

Yours, very truly,
W. B. ATKINSON, M. D., *Permanent Secretary.*

Mr. Good moved a vote of thanks to the Committee for the effectual work accomplished by them. The motion was seconded by Mr. Hallberg, and was adopted.

Mr. Sheppard moved that delegates be appointed from this Association to the new Section of the American Medical Association. Mr. Manning seconded the motion, and offered as an amendment that the committee that had just reported be retained to act as the delegation. Mr. Hallberg moved to postpone action until the subject could be more fully discussed; this motion was not seconded. It having been stated that the Committee had been in existence for two years, attention was directed to the fact that the establishment of the new Section by the American Medical Association had been proposed at the meeting of that Association in 1889, and that final action was taken at the meeting held during the present year.

Mr. Sheppard accepted Mr. Manning's amendment, and the motion was passed.

Mr. Sayre moved the appointment of a committee of five to consider the relations between the American Pharmaceutical Association and the American Medical Association. He explained that since a Section on Pharmacy had been established by the American Medical Association, it might perhaps be advisable to organize a Section in which physicians, or delegates from that Association, could consult with the American Pharmaceutical Association.

The motion was seconded and adopted.

Mr. Ebert gave written notice of an amendment to Article III. of the Constitution, inserting after the words "Permanent Secretary," the words "an Assistant Secretary." The motion lies over until the next annual meeting.

On motion of Mr. Whelpley the privileges of the floor were extended to all members of the Pharmacopœial Revision Committee now at Old Point Comfort, who are not members of this Association.

The Association then adjourned until Tuesday morning at ten o'clock.

SECOND SESSION—TUESDAY MORNING, SEPTEMBER 9.

Owing to the protracted session of the Council, the meeting was not called to order until 11 o'clock, President Simmon in the chair.

The minutes of the first session were read and approved.

Mr. Alexander on behalf of the Nominating Committee read the following report:

> The Committee on Nomination respectfully report that they have made the following nominations:
>
> *President.*—Alfred B. Taylor, Philadelphia.
> *First Vice-President.*—A. B. Stevens, Ann Arbor.
> *Second Vice-President.*—Chas. E. Dohme, Baltimore.
> *Third Vice-President.*—J. M. Good, St. Louis.
> *Permanent Secretary.*—J. M. Maisch.
> *Treasurer.*—S. A. D. Sheppard, Boston.
> *Reporter on the Progress of Pharmacy.*—C. L. Diehl, Louisville.

Members of Council.—P. C. Candidus, Mobile; C. F. Goodman, Omaha; H. M. Whelpley, St. Louis.

Attest: M. W. ALEXANDER, *Chairman Committee.*
H. M. WHELPLEY, *Secretary Committee.*

On motion of Mr. Main the report was accepted, and on motion of Mr. Hallberg the Secretary was instructed to cast an affirmative ballot for the nominees. The chair appointed Messrs. Ebert and Gordon tellers, who, after the ballot had been deposited, reported that the nominees had been duly elected.

The Secretary of the Council reported the names of 37 candidates for membership, whose propositions had been examined by the Council; on motion the candidates were invited to join.

The minutes of the Council-sessions held since the first session of the Association were read, and on motion of Mr. Goodman were approved. The minutes give the following information:

THIRD SESSION OF COUNCIL, HYGEIA HOTEL, SEPTEMBER 8, 6:15 P. M. (nine members present).

The Committee appointed to adjust an account on the old ledgers, reported that this had been done to the satisfaction of Mr. J. F. Hancock. The Council approved the action.

The propositions of 26 candidates were examined and ordered to take the usual course.

FOURTH SESSION—HYGEIA HOTEL, SEPTEMBER 9TH, 9:15 A. M. (twelve members present).

The report of the Publication Committee was examined, accepted, and referred.

Report of the Publishing Committee.

Although the meeting in 1889 was held about two months earlier than usual, but very little time was gained thereby towards the issuing of the Proceedings, because the Report on the Progress of Pharmacy, which forms such an important part of the Proceedings, is required to include abstracts of the pharmaceutical publications to June 30 of the year in which it is presented. The book was ready for distribution early in January, and was sent to nearly all the members, who were entitled to it at the time, by express; others received it by mail. The volume contains 874 pages, and the expenses for publishing and for distribution, as well as for insuring the property of the Association, were as follows:

Proceedings:	Stenographic report	$130 00	
	Composition, paper and presswork	1578 91	
	Queries and reprints	16 75	
	Binding and wrapping 1400 cloth, 150 paper	316 15	$2041 81
Journals for use of reporter, 1889		$23 72	
1890		12 37	36 09
Other expenses of the Secretary:	Woodcuts	$18 50	
	Circulars, etc.,	34 75	
	Telegrams	1 30	
	Expressage and freight	302 94	
	Postage stamps	67 75	425 24

Premium for fire insurance (Hanover F. I. Co., New York)	9 00
Salaries of Reporter and Secretary	1500 00
Total	$4012 14

Compared with former years, the expenses for expressage, etc., are high, which is due, as before stated, to the volume having been sent to most members by express, instead of by mail, as had been done in the preceding year. This increase in one item is more than compensated for by the decrease for postage paid during the year.

The stock of Proceedings on hand, which are stored at the Philadelphia College of Pharmacy, is as follows:

1851.	283 in paper.			1872.	90 in paper.	8 bound.
1852.	67 “			1873.	16 “	90 “
1853.	68 “			1874.	128 “	14 “
1854.	41 “			1875.	65 “	35 “
1855.	84 “			1876.	42 “	47 “
1857.	241 “	8 bound.		1877.	48 “	84 “
1858.	54 “	7 “	115 loose.	1878.	58 “	108 “
1859.		24 “		1879.	20 “	91 “
1860.		194 “		1880.	80 “	46 “
1862.		263 “		1881.	51 “	27 “
1863.		251 “		1882.	48 “	71 “
1864.	171 “	99 “		1883.	44 “	128 “
1865.	150 “	12 “		1884.	52 “	201 “
1866.	66 “	63 “		1885.	111 “	233 “
1867.	144 “	70 “		1886.	64 “	263 “
1868.	51 “	136 “		1887.	60 “	200 “
1869.	97 “	138 “		1888.	71 “	178 “
1870.	107 “	81 “		1889.	13 “	35 “
1871.	92 “	49 “				

Notwithstanding the reduced price at which the older volumes of the Proceedings are now offered with the view of inducing members to complete their sets of these valuable publications, but few have availed themselves of this opportunity. Still the stock is gradually diminishing, and the time appears to be not far off when one or two issues will be entirely out of print, in addition to that for 1856, which has not been in stock for a number of years. No meeting having been held in 1862, no Proceedings for that year were published.

The insurance on the above, and on other property of the Association, kept in store at the Philadelphia College of Pharmacy, has been placed in the Hanover Fire Insurance Company of New York, the amount being $3000, and the annual premium 30 cents on $100.

The Publishing Committee having learned of an appeal made for the library of the University of Toronto, which was destroyed by fire during the night of February 14th last, concluded to donate to this Institution, on behalf of this Association, as complete a set of the Proceedings as could be procured. The grateful acknowledgments of its officers for this gift have been received.

The Publishing Committee is gratified to be able to report good results from the sale of the National Formulary. When, in 1887, the Committee was directed to put it on sale, the order was coupled with the exceedingly indefinite instructions *at the lowest price possible after paying all necessary expenses.* In the report presented in 1888, it was stated that the wholesale price decided upon was calculated to net the Association for the first 3000 and 6000 copies, respectively less than four cents and about eight cents.

For the better comparison of these figures with the actual cost of printing and binding, it should be stated that the estimated profit was 7.7 per cent. and 28 per cent. respectively; or, in other words, it was estimated that, after selling 6000 copies, the receipts would give a surplus of about 28 per cent. on the actual cost of issuing the work, which surplus might go to gradually reimburse the Association for expenses incurred toward the Formulary before putting it into the hands of the printer. The Association having been at no expense for clerical labor or book-keeping, and at no expense for distribution, with the exception of freight and postage, the result was even better than anticipated, and, from the report of the Auditing Committee, it will be seen that at the beginning of the present fiscal year the cash profit amounted to 41.62 per cent. on the cost, or $1623.24. Since the total expenses of the Committee on the National Formulary have been $575.19 (see Proceedings of 1889, p. 16), it follows that the absolute cash profit amounted to $1048.05, to which must be added from bills receivable $216.18, and estimated profit of $400 from copies still on hand, making a total of $1664.23 profit over *all* expenses connected with the National Formulary. And even this is not all: for the expenses incurred cover also the 1384 copies distributed gratuitously to members and others, at a wholesale value of $711.70. (See Proceedings 1889, p. 16, and Report of Auditing Committee for 1890.)

The total number of copies printed to June 30, 1889, was		13009
Copies on hand	1220	
Copies distributed gratuitously	1384	2604
Leaving copies actually sold		10405

The following letter explains itself:

AMERICAN PUBLIC HEALTH ASSOCIATION,
SECRETARY'S OFFICE,
CONCORD, N. H., *January* 21, 1890.

Secretary American Pharmaceutical Association.

DEAR SIR:—Your favor of December 10, 1889, transmitting several copies of reprints from the Proceedings of your Association, relative to the subject of arsenic in wall paper, was received in due time, but its acknowledgment was overlooked until now. I shall take great pleasure in presenting the subject of arsenical wall paper to this Association in the manner indicated in the resolution which your Association adopted at its last meeting. The subject is, indeed, one of great importance, and it is very proper that the American Public Health Association should give greater publicity to the matter, and also take steps to secure throughout the country better and more uniform legislation to prevent the use of arsenical wall papers and fabrics.

Very truly yours, IRVING A. WATSON, *Secretary.*

The subject was brought to the attention of the American Public Health Association pursuant to a resolution adopted last year at San Francisco, (see Proceedings 1889, page 79.)

Respectfully submitted,

C. LEWIS DIEHL,
LEWIS C. HOPP,
J. H. REDSECKER,
J. M. MAISCH.

Mr. Hopp was appointed a Committee to examine credentials and compare them with the report of the Permanent Secretary. The report was found correct, and credentials were ascertained to have been received from the following:

Colleges of Pharmacy: Buffalo, Chicago, Illinois, Louisville, Maryland, Massachusetts, National (Washington, D. C.), New York, Philadelphia and St. Louis.

State Pharmaceutical Associations: Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire New Jersey, New York, Ohio, Pennsylvania, Rhode Island, South Dakota, Texas, Virginia, Wisconsin.

Local Associations: N. Y. German Apothecaries; Norfolk and Portsmouth, Va.; and St. Louis Microscopists.

Alumni Associations of Colleges of Pharmacy: Buffalo, Cincinnati, Maryland, National, New York, Philadelphia.

Representatives of the National Wholesale Druggists' Association: Thos. F. Main, M. N. Kline and Chas. E. Dohme.

Two of the members of the Retrenchment Committee, appointed after the San Francisco meeting by the Chairman of the Council, being present, the report of that Committee, which had been in the hands of the Council for some months, was now taken up for discussion and action in regard to the proposed alterations of the By-Laws recommended therein. The report is as follows:

BOSTON, *December* 9, 1889.

To the Council of the American Pharmaceutical Association:

GENTLEMEN.—The undersigned having been appointed a committee "To devise some plan by which the current expenses of the Association shall not exceed the income from annual dues and fees, and rigid economy is urged until a surplus of at least two thousand dollars ($2000.00) shall have been accumulated from this source," beg leave to report that they have attended to the duty assigned them, and after carefully going over the items of expenditure in the Association for several years past, respectfully offer the following recommendations as being, in their judgment, the best plan for bringing about the desired retrenchment:

1st. That the salaries of the Secretary and the Reporter on Progress of Pharmacy, be fixed at the sum of six hundred dollars ($600.00) each per annum.

2d. That the salary of the Secretary of the Committee on Membership be fixed at the sum of one hundred dollars ($100.00) per annum.

3d. That the Secretary of the Association shall act also as Secretary of the Council.

4th. That the bond required of the Treasurer be reduced to the sum of five thousand dollars ($5000.00), thus saving fifty dollars ($50.00) per year to the Association. The admirable financial system of the Association as at present existing, seems to warrant your committee in making this recommendation.

5th. That a sum not exceeding one hundred dollars ($100.00) shall be allowed the Committee on Papers and Queries, for printing, previous to the meetings of the Association.

6th. That the number of volumes of Proceedings published shall not be in excess of one hundred and fifty (150) over and above the number of members in the Association.

7th. Your committee recommend the abolishment of the awarding of medals to exhibitors as was done in 1887, as being an unwise and injudicious policy that the Association cannot afford to continue.

To conclude, your committee believe that the adoption of the above recommendations will soon bring the treasury of the Association up to the two thousand dollars ($2000.00) surplus suggested by the resolution offered at the San Francisco meeting.

Respectfully submitted,

HENRY CANNING,
H. M. WHITNEY, } Committee.
F. H. BUTLER,

On motion of Mr. Eckford the propositions contained in the report were considered seriatim, and, after considerable discussion, a motion to refer to the incoming Council having been lost, the following action was taken:

1 and 2. The propositions to reduce salaries were negatived.

3. The proposition to make the Secretary of the Association also Secretary of the Council was negatived.

4. The proposed reduction to $5,000 of the Treasurer's bond was agreed to.

5. The annual appropriation of a sum not exceeding $100 for the printing of papers was agreed to.

6. The limitation of the copies of Proceedings to be published was decided in the negative, as being impracticable in the manner suggested.

7. The proposed abolishment of exhibitor's medals was concurred in.

On motion of Mr. Canning it was recommended that the Association discontinue to furnish gratuitously a copy of the Proceedings to each State Pharmaceutical Association, they having no libraries.

Mr. Eliel advocated an amendment to Chapt. VIII., Art. III., of the By-Laws of the Association, with the view of requiring hereafter an admission fee of $5 from incoming members. On motion of Mr. Canning the subject was laid upon the table.

The Committee to whom the letter of Mrs. L. E. Markoe had been referred (see Proceedings 1889, p. 24) reported that they could see no reason or necessity for re-opening the matter.

The propositions of 11 candidates for membership were examined and ordered to take the usual course.

Mr. Sheppard suggested that the amendment to Chapt. IX., Art. XI., Section 7 of the By-Laws, proposed by Mr. Alexander at the first session, be considered; and moved the adoption of the amendment. The motion was carried without a dissenting vote.

Mr. Ebert proposed an amendment to Chapter VIII., Art. II. of the By-Laws, to insert in the last line after the words "and paying," the words "an initiation fee of five dollars and," so as to make that clause read, "and paying an initiation fee of five dollars and the annual contribution for the current year." Under the rules, the proposition lies over until a subsequent session.

Mr. Sheppard moved that the next annual meeting be held at Nashville, and Mr. Bond moved to amend by substituting Hot Springs for Nashville. The Chair ruled the motion out of order at the present time.

Mr. Main moved that a committee of five be appointed to consider and report on the time and place of the next annual meeting. The motion was seconded and adopted, and the Chair appointed Messrs. Goodman, of Nebraska, Alexander, of Missouri, Whitney, of Massachusetts, Heinitsh, of Pennsylvania, and Sheppard, of Massachusetts, said committee.

The report of the Committee on Prize Essays being called for, the following verbal report was rendered:

MR. PATCH.—In regard to the Ebert prize for the best paper submitted, a question has arisen in our minds as to what the prize was to be given for. Assuming, however, that it was the intention of the originator of the prize that the improved methods for the preparation of chemical products should include that paper which was the most original in investigating a chemical compound and opened up the newest field of discovery, your Committee is unanimous in awarding the prize to the author of "The Coloring Principle of Flowers," Mr. W. T. Wenzell, of San Francisco.

The amendments to the By-laws proposed at the last annual meeting in San Francisco, and contemplating the consolidation of the two Sections on Pharmaceutical Legislation and on Pharmaceutical Education into one, were next called up. The amendments were read, as follows:

Chapter VII., Article I. In first line strike out *six* and insert *five*, and in fourth and fifth lines strike out *a Committee on Legislation, and a Committee on Pharmaceutical Education*, and insert in place thereof *and a Committee on Pharmaceutical Legislation and Education*, so as to make the article read as follows:

Article I. There shall be five standing committees: A Committee on Commercial Interests, and on the Revision of the U. S. Pharmacopœia, each to consist of five members; a Committee on Scientific Papers, a Committee on Prize Essays, and a Committee on Pharmaceutical Legislation and Education, each to consist of three members.

Article VII. In first line and also in second line, strike out the words *on Legislation*, and insert in both places the words *on Pharmaceutical Legislation and Education;* strike out in fourth line the words *the subject*, and insert in place thereof *pharmaceutical subjects;* also in sixth line strike out *and*, and after the word "discussion" add, *and shall attend to such duties as may be delegated to them by the Section;* so as to make the article read as follows:

Article VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. They shall arrange the business of the Section in advance of its meetings, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to them by the Section.

Article IX. Strike out the whole article.

Chapter IX., Article II. In first line strike out *four* and insert *three;* and in last line strike out *Education; 4. Legislation*, and insert *Legislation and Education;* so as to make the article read as follows:

Article II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows: 1. Scientific Papers; 2. Commercial Interests; 3. Pharmaceutical Legislation and Education.

Strike out the present Article VII., and insert in place thereof the following:

Article VII. At the eighth session, the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

The objects of the amendments were again explained by Mr. Ebert; and Mr. Kennedy moved their adoption as a whole. The motion was seconded and unanimously adopted.

The President read a telegram from Norfolk, Va., signed Faber & Friese, offering to take a group-photograph. After some discussion an answer was returned that there was no objection to the offer.

The President appointed the following Committee on the Relations with the American Medical Association: Jos. P. Remington, of Philadelphia; Lucius E. Sayre, Lawrence, Kansas; Alonzo B. Stevens, Ann Arbor, Michigan; John F. Patton, York, Pa.; and Wm. S. Thompson, Washington, D. C.

To the Members of the American Pharmaceutical Association:

Your committee to whom was referred the President's address, respectfully report:

We recommend that a committee of five be appointed to draw up suitable resolutions in reference to the death of our late President, Emlen Painter.

We recommend that the Section on Education and Legislation appoint a committee to give the subject of Apprenticeship full consideration, and report such plans as seem practical on this subject to the Association.

We approve of the meeting of our Committee on Legislation with the Conference of the State Secretaries, to formulate some plan for legislation whereby the certificates of the State Boards of Pharmacy may be interchangeable.

We do not approve of the plan proposed in the address in reference to electing the Presidents of State Pharmaceutical Associations Vice-Presidents of this Association. This would require a complete change of the laws that govern our present form of organization.

ALBERT E. EBERT,
W. J. M. GORDON,
CHAS. E. DOHME.

On motion of Mr. Nattans, the report was accepted; and on motion of Mr. Main, the recommendations were ordered to be taken up seriatim.

The first recommendation, to appoint a Committee relative to the death of President Painter, being under consideration, Mr. Hallberg moved an amendment that with the next volume of the Proceedings a phototype of Mr. Painter be published. The amendment was seconded and carried; and the motion as amended was then adopted.

The second and third recommendations, referring to the appointment of a Committee on Apprenticeship, and to a conference with State Secretaries, were, on motion, approved.

The fourth recommendation, disapproving of the suggested election of Vice-Presidents of the Association, was, on motion of Mr. Nattans, concurred in. The Committee's report, as amended by Mr. Hallberg's motion was then adopted as a whole.

The President appointed Messrs. Bedford, Remington, Gordon, Alexander and Ebert the Committee on Resolutions in reference to Mr. Painter's death.

Mr. Ebert suggested, in case no other business was to come before the Association at the present time, that some expression of views be had in regard to the restoration of an admission fee on becoming a member of the Association.

MR. EBERT.—There is an important matter that we might discuss now if we have time, so that when we come to vote on it, we will be thoroughly prepared to do so, and not occupy time unnecessarily in deciding it. I refer to the amendment in regard to the finances. This is a most important subject. We are certainly in no position to continue as we have been doing, losing money each year, and managing in a way which will eventually bring us into the same condition as we were in some years ago. I personally take this position and do it earnestly, because I fought against this change, which was carried at the time with a hurrah at the Providence meeting. The sentiment was then freely expressed, "We want no surplus of money; we will get along without it." But we are now just on the verge of getting where we were in 1870, when this Association was embarrassed because it had no money; and I remember well the time when we had to put our hands in our pockets and pay the expenses for a year, and even taxed some of you gentlemen twice that year, or in other words made you pay double annual dues without your knowing it. You had to pay ten dollars instead of five, in order to bridge over the difficulty of this financial embarrassment. Now, we ought not to come back to the same condition where we have been before. I wish to state right here that we have property amounting to some thirteen thousand dollars; we cannot, however, make use of it for defraying the annual expenses, and we must raise enough money to meet current expenses each year independent of our property on hand.

Now, when a person comes to this Association and applies for membership, he should be taxed an initiation fee, because when he becomes one of us he enjoys all the privileges that we enjoy, and shares with us what we possess in property and otherwise, and he ought to be made to pay for it something beside annual dues. If it is not worth a five-dollar initiation fee to get into this Association, he had better stay away. Let him pay the five-dollar membership fee aside from the annual dues. He can come in now and get the certificate of membership, pay the annual due, and resign his membership the next year, and in two or three years apply again, and come in again: and so it goes on. That is no way to manage membership in this Association. We should reinstate the membership fee or initiation fee, and it is just as well to do it at this meeting as two or three years hence when we are without money. I give notice of an amendment to that effect, and I think this is the time to discuss the subject. I should like to hear from Mr. Thompson, who had suggested to abolish the fee for admission to membership.

MR. THOMPSON.—Mr. Ebert has hardly given my views on the subject. I believe that I brought before the Association the abolition of the admission fee, on the ground that this Association was organized for the purpose of disseminating knowledge throughout the ranks of pharmacy, and enlisting from those ranks every man on the continent who was engaged in pharmacy, and desired to unite with us for this general object.* This being the object of the Association, it seemed to me to be a stumbling-block right at the threshold to tell a gentleman when we wanted him to become one of us, that we charged him a five-dollar initiation fee. Again, on financial grounds the initiation fees paid into the treasury never amounted to a great deal. It was five dollars from each new member. If we had from forty to sixty new members a year, it amounted to two or three hundred dollars. If we got in by abolishing it fifty or sixty new members additional each year that we would not get with it, the amount of revenue to the Association in the end would equal just what it was with the initiation fee. Now, we have no initiation; we don't initiate a man, but simply invite him to become a member of the Association, and, if he accepts the invitation, he pays his dues the same as the rest of us. I hope this Association will not find it necessary to take a backward step and restore this relic of barbarism, as we might aptly term it, of charging a man for becoming a member of an Association like this.

MR. CANNING.—Mr. Ebert has drawn rather a dark picture of our finances. I had occasion to look over that matter considerably during the past year, and notwithstanding, the Committee of which I was a member brought in a report on retrenchment, I do not think it inconsistent to object to the plan offered by Mr. Ebert. I fully agree with what Mr. Thompson says, that we want all the men to come in that we can get. But independent of that I found to-day, although I might have known it before if I had thoroughly read through the By-Laws, that we have a Life Membership Fund, which is invested, and strange to say, up to this time has not been counted in the estimates of income. It was allowed, as I understand, to accumulate. Am I right, Mr. Secretary?

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* See Proceedings 1884, p. 482, also 1885, p. 514; 1886, pp. 133, 170 and 179, and 1887, pp. 472, 485 and 504.

THE SECRETARY.—Yes, to a certain extent it has accumulated; the whole history is in the preliminary part of the last volume of the printed Proceedings.

MR. CANNING.—In addition to that, it is also stated in our Constitution that the income of that permanent Life Membership Fund shall be used for current expenses. The treasurer also informs us (and it has solved the difficulty for the present, at least, by enabling us to manage without reducing the salaries) that the income of that will help us out so much that there will be a surplus in the treasury from year to year from that and the annual dues alone. As I said, I only discovered to-day the provision that that income shall be used for current expenses. Now, with that and the annual dues, as the Treasurer states, being sufficient to help us out, I sincerely hope that we will not go back to the admission fee. I do not like to charge a man for coming in. Get him in and keep him in. I think further, if we could reduce the dues to $3 or to two and a half, we would get more than its equivalent back in membership.

THE SECRETARY.—I would like to say a few words on this subject. I was very strongly opposed to the abolition of the admission fee, and for general reasons. I thought it was no more than right to retain it, because the Association virtually has a certain amount of property in which every member becomes a part owner as soon as he joins, and he can assist in voting away that property. That property has gradually accumulated from the Life Membership Fees, but at various times when a sufficient surplus had accumulated, the Association has taken out of the General Fund some money and put it into the Life Membership Fund for permanent investment. The income from this invested fund is to be used for current expenses. It was the original idea advocated by me that the Life Membership Fund be gradually increased with the ultimate view of making that fund large enough to reduce the annual dues to two or three dollars.

MR. STEVENS.—I understand fully, I think, why the abolition was made; if we consider the matter in a practical way it will be seen that we have really gained by it. Of course the names I have heard read here are those of persons invited to become members, but not those who have necessarily joined, and the number will be cut down to some extent. How many members have we had join from year to year ?* Will their number not meet this deficiency ? If you tax a man for coming in, wouldn't it cut down the actual number of those who join our Association ? I understand that we have a certain amount of money, and on joining the Association we become stockholders, as we might say. At the same time new members do not come with that in view, but for the practical benefits they will derive from membership. If it could be in any way arranged, I would rather make our yearly dues one dollar extra, which would amount to half a dozen times what we would receive by the initiation fee of five dollars. What is the use of considering the amount of money derived from the initiation fee ? For my part, I would rather pay the additional dollar each year, and I think there are others in the same condition, than shut out anybody from becoming a member of our Association, especially after having voted down the retention of the admission fee.

MR. WHELPLEY.—I have not heard all the discussion, but on one point I would pass an opinion, that is, regarding the shutting out of members by establishing an initiation fee. I was of the same opinion a year ago, but experience has taught me since that the majority of those who want to join expect to pay an initiation fee, and surprise is expressed continually that a new member is not required to pay something. It certainly seems rather strange that a man can simply sign the constitution and become equal partners with us in the American Pharmaceutical Association, without paying even a small initiation fee to the amount of one year's dues. I would certainly be in favor of an initiation fee in case we must take a step in this direction, instead of raising the amount of the annual dues. Let those who come in at the later hours pay for it.

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* For a period of six years see Proceedings 1887, p. 449; see also the annual report of the Committee on Membership.—SECRETARY.

THE PRESIDENT.—I would suggest that this is merely an informal discussion of the amendment to be voted upon at the next session.

MR. EBERT: I brought this matter up for the purpose of getting an informal vote upon it, if it seemed advisable. If the Association considers from what has been said that we require no more money, and can continue in the way that we are going, let us vote it down now, and I will withdraw the amendment. My only object was to gain time.

Mr. Canning favored the wish expressed by Mr. Ebert, and the Chair requested that the vote be taken by rising; of the members present 41 voted for and 37 against the proposed amendment.

The President announced the following Committee to visit the National Wholesale Druggists' Association, it being understood that vacancies may be filled by the chairman: Wm. S. Thompson, Washington; T. J. Macmahan, New York; James T. Shinn, Philadelphia; John F. Patton, York, Pa., and Henry Canning, Boston.

Mr. Goodman, on behalf of the Committee on the time and place of the next annual meeting, presented the following:

Your Committee respectfully report that New Orleans has been selected as the place in which to hold the next annual meeting, and the second Monday in May as the time for holding the same.

There is also a minority report by Mr. Whitney.

MR. WHITNEY.—The minority report by the chairman and myself strongly recommends St. Louis as the place in which to hold our next annual meeting, and the time for holding it the second Monday in May. And, further, that this matter may be settled, I move that when this Association adjourns, it adjourn to meet in St. Louis on the second Monday in May, 1891. The reason that we recommend May is, that several members from St. Louis who are present, say that month is decidedly the best time. Another reason is, that heretofore members of the Association, as a rule, have gone in September, when, all their clerks having taken a vacation, they are tired out. I am inclined to think that May would be the better time.

MR. ALEXANDER.—The reason why the time was fixed for the second Monday in May is that in September we cannot properly entertain you. The Exposition is held then, and our hotels are crowded to their utmost limit. In May we can take care of you, and give you as good an entertainment as you have had anywhere, and will be glad to do it, and give you a cordial welcome. I am very much in favor of St. Louis, although I did not vote that way in our Committee meeting. The policy of this Association has been to hold its meetings at places in which the interests of pharmacy would be advanced by so doing, and I was very greatly in favor of New Orleans, because no meeting has yet been held in the far South. I would say, however, as a St. Louis man, that it is not to be understood that we do not want this Association to visit our city. We do want you to come, but in May, not in September.

The reports having been received, Mr. Sheppard moved the adoption of the majority report.

Mr. Finlay.—I desire to second that motion, and to speak in favor of New Orleans. The furthest point south which this Association has yet visited is Atlanta, Ga. That is certainly a southern point, but I would like the members of the Association to see something more of what has been known as the "sunny South." A better point for this purpose than New Orleans could hardly be found, as many who are present can attest. We have a grand city, with its magnificent river frontage, its institutions well worth visiting and studying, and, added to this, the beautiful flora of the South. I can assure you above all of one thing, and that is a hearty welcome on the part of members of the American Pharmaceutical Association residing there, as well as of the local Association. I therefore recommend New Orleans as the place, and the second Monday in May as the time for meeting.

Mr. Ebert.—I believe it is our duty to go to New Orleans. We have had members from there as far back as I can recollect, and it is time now to acknowledge their support. It is the time to go to New Orleans, not simply because we want to visit a place where we can have a pleasant time, but because we desire to go to a place where we can do some good. We have never been so far South yet, and that is where our duty lies. We have been to the East a number of times; we have been to the Pacific Coast, and to the Central States; and, as to St. Louis, that city ought not to claim our choice until we have been to Chicago. After that, St. Louis may be considered.

Mr. Alexander.—His objection is very good, so far as it goes; but to that point I object.

Mr. Ebert.—I want to say, also, that if you want a pleasure trip, get on the steamer at St. Louis and drift down to New Orleans, and you will have as fine a ride as you ever had in your life. You can get on board above St. Louis, if you wish, and come down the Ohio or the Illinois river. Or, from Chicago, you can have a direct line to New Orleans, and just as good a road as you had to come here. But I repeat, it is our duty to go South. I know the hospitality of those people; one of the greatest meetings we ever had was at St. Louis, although Chicago was ahead.

Mr. Eliel.—It seems to me that for the last few years this Association has been in the habit of going to extremes. Last year, for instance, we met at the extreme western end of this continent. This year we meet at an extreme eastern point. Now it is proposed that we visit an extreme southern point. As far as I am concerned, if I am so situated that I can go to New Orleans I will gladly do so; but these long trips take up a great deal of time, and are expensive. When our California trip was proposed we were told that we could get very low special rates; when the time came, however, for obtaining these rates, those of us who went know what they were! All these things should be taken into consideration. I wish to say nothing against the choice of the Association as far as New Orleans, St. Louis, or any other extreme point is voted upon; but I would like to have the members of this Association consider the matter well before voting.

Mr. Whitney.—I think every member of this Association would have been astounded if Mr. Ebert, of Chicago, had got up and proposed St. Louis. I don't believe St. Louis ever proposed anything that Chicago did not oppose, as Minneapolis opposes St. Paul. They are thinking of prohibiting the reading of the Bible in the schools of Minneapolis, because St. Paul is mentioned so often and Minneapolis is left out. I want to say, in good faith and in the interests of the Association, that the minority report of the committee should take the place of the majority report.

THE PRESIDENT.—The majority report is before the House, and has been seconded.

MR. WHITNEY.—As an amendment, I move that St. Louis be inserted in place of New Orleans.

MR. HALLBERG.—As one of the members from Chicago, who are said to never like to see anything go to St. Louis, I desire to repudiate the statements made by Mr. Whitney, as well as by Mr. Ebert. There is no city in this country as centrally located, as magnificently surrounded, or as suitable in every respect for a place of meeting as the city of St. Louis. I recognize the advantages of the Crescent City, and were I to consider my own personal satisfaction I would go to New Orleans; but I recognize that the interests of this Association are paramount to every consideration, and for that reason I want this Association to meet at a central point this coming year. We met in 1889 at an extreme western point, in 1890 we meet at an extreme eastern point. If we are going to meet again at an extreme point, it may prevent a great many members from attending the annual meeting, and I do not think we can afford, for the third time, to visit an extreme point. I hope to have the privilege of going to New Orleans within the next few years. There is another reason why I desire to go to St. Louis. We have not been there for twenty years. In St. Louis we can attract a larger addition to our membership than we can at any other place. I am satisfied that if this Association meets in St. Louis next year, we will have from three to five hundred members in this Association.

I second Mr. Whitney's amendment.

MR. CANDIDUS.—As a member from the vicinity of New Orleans I can give information on some points that may not be generally known to those who have not been there. We met some years ago in what is called a southern city, Atlanta, but a great many members at that time were prevented from going. If we meet in New Orleans we will find a true southern city, with genuine southern hospitality. As for St. Louis and Chicago, let them fight their fight out. St. Louis in the summer time is the hottest place in the country, and in the winter time it is the coldest. In New Orleans you will find the delightful gulf breeze, which makes you feel very pleasant. I would rather have you meet in Mobile, for Mobile is a better place than New Orleans; but we have not enough hotel accommodations, and therefore, I am in favor of New Orleans.

MR. ELIEL.—I did intend to vote for New Orleans, but now that Mr. Candidus speaks so highly of that city, I am going to vote for St. Louis.

MR. NATTANS.—I think that the time of meeting is of importance. Many members would vote for one city or the other were the time settled first. I for one cannot go in May, and there are many others who will be unable to do so, and it may change their vote when that matter is settled. I would suggest that it be stated positively whether we must go in May if St. Louis is selected.

THE SECRETARY.—It has been customary for this Association to vote separately on the time and place, and this could be done in this case. Merely amending one report does not imply the adoption of the whole of it. You can amend it again if you choose. The time proposed in both reports is the same, the second Monday in May.

A vote was ordered on Mr. Whitney's amendment; 26 members voted in favor of it, and 64 in opposition—so the motion to amend was lost. The question being taken on the original motion to adopt the majority report, it was adopted without a dissenting vote.

The Secretary read the following communication from the Secretary of the Virginia Pharmaceutical Association:

OLD POINT COMFORT, *September 9th*, 1890.

The following resolution was unanimously adopted at the first session of the Virginia Pharmaceutical Association: That the members of the American Pharmaceutical Association be respectfully invited to attend the sessions of the Virginia Pharmaceutical Association, and accorded the privileges of the floor, which are cordially extended to them.

The communication was, on motion, received with the thanks of the Association.

Mr. Remington moved a reconsideration of the time for holding the next annual meeting, since the meeting of the American Medical Association was likely to take place in May. The motion was seconded and carried; and Mr. Remington then moved to amend the report by substituting the first Monday in the place of the second Monday in May.

MR. OSMUN.—I wish to make an amendment that the time be changed to the second Monday in October. A meeting in May would interfere with several of the State Association meetings. That of New Jersey takes place in May, and those of New York, Pennsylvania, Massachusetts and several others take place in the month of June. The members will either have to sacrifice their State meetings, or have the time altered.

MR. REMINGTON.—If any time in October is selected, the gentlemen who have anything to do with the teaching schools of pharmacy will be unable to attend the meeting, because the colleges open in October. I do not mention that as being so very important, as I know you can get along without the professors; but as interests are being considered, that is one which may deserve some attention. I know it is very difficult to fix a time which will suit every one, and I did not open this question to make any great change, but merely to decide upon one week earlier than that named, which will harmonize all differences.

MR. ALEXANDER.—The gentlemen from New Orleans suggested the time themselves. The question was whether we should hold the meeting on the first or second Monday in May, and they decided upon the second, although there does not seem to be very much difference as to which week it is held in. There is a serious objection, however, to going in the fall of the year. You gentlemen from the South know that the germs of yellow fever never cause any trouble until about midsummer, if any trouble ever does arise, and for that reason it is unwise to go in the fall of the year. I therefore hope that Mr. Remington's amendment will prevail, and that the first Monday in May will be chosen.

MR. FINLAY.—October would certainly be an improper month to meet in New Orleans, as we never know what may happen in the summer. While we have had twelve years of immunity from yellow fever in New Orleans, we can never tell when an unlucky year may come. It is always safe before the first of June, however. I endorse the amendment made by Mr. Remington, and would recommend that the first Monday in May be selected as the time of meeting.

MR. MARKOE.—So far as the State Association meetings are concerned, they generally have movable dates. I can speak for Massachusetts in that respect, as we have on several occasions altered the time of meeting, and last year, so that it would not conflict with that of the American Pharmaceutical Association. I think that no local interests will clash with the time that is most suitable for this meeting in the South. I regard it to be our duty to go South, and, if we go, we should go in fair numbers, and do all the good that we possibly can to the district in which we meet.

The amendment offered by Mr. Remington was then put to a vote and carried, and the report, as amended, was unanimously adopted. The Association then adjourned.

THIRD SESSION.—TUESDAY AFTERNOON, SEPTEMBRR 9.

The session was opened at 3:10 o'clock, President Simmon in the Chair. The Permanent Secretary read the minutes of the second session, which were, on motion, approved.

The Secretary read the following communication:

MR. KARL SIMMON, *President American Pharmaceutical Association:*

I have the pleasure of announcing that Professor Jos. P. Remington will deliver a lecture on the Metric System before our Association to-morrow morning, September 10, at 11 o'clock, and to communicate to you the following resolution:

Resolved, That the members of the American Pharmaceutical Association be invited to attend the session of this Association on Wednesday morning, at 11 o'clock, for the purpose of hearing Professor Remington's lecture on the Metric System.

Very respectfully, C. B. FLEET,
Secretary Virginia Pharmaceutical Association.

Mr. Stevens moved to invite the Virginia Pharmaceutical Association to meet in this room on Wednesday morning, to listen to Professor Remington's address. The Secretary moved to amend that the communication be referred to the Section on Scientific Papers. The amendment was accepted by Mr. Stevens, and the motion as amended was adopted.

The Association then adjourned, to give way to the Section on Commercial Interests.

FOURTH SESSION, TUESDAY EVENING, SEPTEMBER 9.

No business was transacted by the Association preceding the second session of the Section on Commercial Interests.

FIFTH SESSION.—WEDNESDAY MORNING, SEPTEMBER 10.

President Simmon called the meeting to order at 10 o'clock. The Permanent Secretary read the minutes of the two preceding sessions, which were approved.

Credentials from the Alumni Associations of the Chicago and St. Louis Colleges of Pharmacy were read and received.

The following telegram was read:

BROOKLYN, N. Y., *September* 9, 1890.

To the President American Pharmaceutical Association: The Kings County Pharmaceutical Society sends congratulations and fraternal greetings to your Association.

F. N. BLISS, *Secretary.*

The Society not being in session at the present time, on motion of Mr. Ebert, the Secretary was directed to make acknowledgment by letter, and in response to the friendly congratulations, convey the cordial greeting of the American Pharmaceutical Association to the Kings County Pharmaceutical Society.

The Secretary of the Council presented the names of sixteen candidates for membership, whose propositions had been examined by the Council at its Fifth Session, held on the morning of September 10. The candidates were, on motion, invited to become members.

SIXTH SESSION.—WEDNESDAY AFTERNOON, SEPTEMBER 10.

SEVENTH SESSION.—THURSDAY AFTERNOON, SEPTEMBER 11.

No business was transacted by the Association preceding the second and third sessions of the Section on Scientific Papers.

EIGHTH SESSION.—THURSDAY EVENING, SEPTEMBER 11.

The Association transacted no business preceding the session of the Section on Pharmaceutical Legislation and Education.

NINTH SESSION.—FRIDAY MORNING, SEPTEMBER 12.

The Association met at 9 o'clock, President Simmon in the chair. The minutes of the fifth and subsequent sessions were read and approved. Mr. Kennedy read the minutes of the Council, which, on motion, were approved; these minutes give the following information:

SIXTH SESSION.—HYGEIA HOTEL, SEPTEMBER 10, 7:45 P. M. (8 members present.)

The propositions of four candidates for membership were examined, and ordered to be reported to the Association.

SEVENTH SESSION.—HYGEIA HOTEL, SEPTEMBER 11, 7:45 P. M. (9 members present.)

Three propositions for membership were examined and ordered to take the usual course.

On motion of Mr. Redsecker, it was resolved that it be recommended to the Association that for the meeting to be held in New Orleans a Committee on Transportation be appointed, consisting of M. W. Alexander of St. Louis, Thos. F. Main of New York, W. J. M. Gordon of Cincinnati, T. N. Jamieson of Chicago, and the Local Secretary.

FIRST SESSION OF THE NEW COUNCIL.—HYGEIA HOTEL, SEPTEMBER 11, 8:15, P. M. (12 members present.)

Mr. Eliel was elected temporary chairman, and G. W. Kennedy temporary Secretary. Nominations for the different officers of the Council were made, and elections held resulting in the election of James M. Good as chairman, Wm. S. Thompson as Vice-Chairman, and Geo. W. Kennedy as Secretary.

The Standing Committees of the Council were nominated and elected, and each of the Committees then elected its chairman; the result was as follows:

Committee on Membership: C. L. Keppler, *Chairman*, J. H. Dawson, H. Canning, C. E. Dohme, and A. B. Stevens.

Committee on Finance: W. S. Thompson, *Chairman*, Leo Eliel, and C. F. Goodman.

Committee on Publication: L. C. Diehl, *Chairman*, J. H. Redsecker, P. C. Candidus, H. M. Whelpley, and J. M. Maisch.

Committee on Centennial Fund (see Chapter VII., By-Laws of the Council): A. B. Taylor, W. S. Thompson, and J. M. Maisch.

SECOND SESSION—HYGEIA HOTEL, SEPTEMBER 12, 9 A. M. (7 members present.)

The propositions of two candidates for membership were examined, and referred to the Association for final action.

On motion of Mr. Eliel the Permanent Secretary was authorized to procure badges, annually, for the President and Vice-Presidents of the Association, said badges to be retained by these officers.

On motion of Mr. Sheppard, Mr. Whelpley was appointed a Committee of one to procure a design for a new permanent badge for the Association, said design to be submitted to the Permanent Secretary and Chairman of the Council for approval; and if the design be thus approved, to have 200 badges made.

On motion of Mr. Sheppard, the Permanent Secretary was instructed to procure two sets of signs, to be used for announcing the sessions of the Association and its Committees.

The propositions of nine candidates for membership were reported from the Council, and they were favorably acted on by the Association.

Mr. Alexander, in behalf of the Nominating Committee, reported the nomination of A. K. Finlay as Local Secretary for the ensuing year. The report was accepted, and, on motion of Mr. Ebert, the Permanent Secretary was instructed to cast the ballot of the Association for Mr. Finlay.

On motion of Mr. Sheppard, the appointment of a committee of five on Arrangements was ordered, the Local Secretary to be the Chairman, and he to select his associates.

Mr. Hallberg stated that at the next annual meeting he would bring in an amendment to the By-Laws, for the creation of a Permanent Committee on Transportation, consisting of five members, one each residing in the cities of New York, Chicago, St. Louis and New Orleans, the fifth member to be the Local Secretary and the Chairman of the committee; each member to secure the best means for transportation in his district, and to act in conjunction with the Chairman of the Committee on Arrangements.

Mr. Remington moved that a committee of five be appointed, with power to act, to carefully consider the resolutions offered by Mr. Oldberg,* and to report what action this Association should take in endeavoring to secure the adoption of metric standards by the Government.

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* See his paper on the Metric System, minutes of the Section on Scientific Papers.

The resolution was seconded and adopted, and the President appointed Messrs. J. P. Remington, O. Oldberg, Chas. Rice, C. S. Hallberg and J. H. Manning said committee.

Mr. Hallberg offered the following:

Resolved, That it would be desirable that the International Pharmaceutical Congress meet in Chicago in 1893;

That a hearty invitation be extended to the pharmacists of all countries to be present at the meeting of this Association in 1893; and

That a Committee be appointed to report upon the matter at a future meeting.

After some discussion, the resolution was adopted.

The Committee from the National Wholesale Druggists' Association being called upon, Mr. Charles E. Dohme was present at the session.

Mr. Dohme.—I desire to say on behalf of the representatives of the National Wholesale Druggists' Association that Mr. Main, the Chairman of the Committee, promised to appear at the section on Commercial Interests and make some statements. He has left, however, I understand, and my instructions only go so far as to represent the National Wholesale Druggists' Association here, to extend its greeting to the American Pharmaceutical Association, and to say that their meeting takes place at the end of this month, when they would be pleased to receive delegates from the American Pharmaceutical Association.

The President stated that a Committee had been appointed to be present at that meeting.

Mr. Connor.—To illustrate the hospitality of our people in Texas, I wish to present the following telegram I have just received:

"Dallas, Tex., *September* 9, 1890.

"The citizens of Dallas, Tex., extend to the Association a most cordial invitation to hold their next annual meeting in this city: will give them a royal reception.

(Signed:) "W. H. Connor, Mayor,
"A. P. Boun, President Board of Trade."

On motion, the message was received with the thanks of the Association.

The installation of the officers-elect being in order, the Chair appointed ex-presidents Alexander and Shinn to conduct them to the platform. When Mr. Taylor appeared upon the platform, he was received with applause, the members rising.

Mr. Alexander.—Mr. President and Gentlemen: [I think one of the gentlemen whom we present to you to-day needs scarcely any introduction, as he is one of the oldest members of the American Pharmaceutical Association, being one of the few surviving members who were present at the meeting of 1851. I present to you the President of the Association for the ensuing year, Mr. Alfred B. Taylor.

Mr. Taylor.—Gentlemen, Members of the American Pharmaceutical Association: I find myself unable to express my feelings for your generous reception. I thank you most sincerely for your kindness in calling me to preside over your deliberations, and can truly say that I esteem it the highest honor I have ever received. I am proud to say that I have been a member of this Association since its formation in 1852 to the present time, and have always taken a warm interest in its success and advancement. I have always been willing to contribute my small share to the common stock, and while accepting this high and honorable duty, I do so with great diffidence. I promise you, however, that I will use my best endeavors to facilitate the business and advance the interests of this Association.

The Vice-Presidents-elect were next introduced.

MR. A. B. STEVENS.—I thank you for the honor you have conferred upon me. I prize it for the reason that it came entirely unsought or even thought of; it came like a thunder clap from a clear sky. While I appreciate the election to fill this office, which I understand is really an honorary one, I know that you have been wise in the choice of a President, who, I am informed, called to order the first meeting of this Association in 1852. The coming year therefore will complete the fourth decade of this Association's existence, certainly a longer record than any of us can hope for, except the younger members. We may feel towards Mr. Taylor as the father of this Association, and we have no doubt that he will act as a guiding father; the least I can do is simply to be an obedient son, and to carry out what duties he may impose on me; and in so doing I shall endeavor to serve this Association.

Mr. C. E. Dohme responded briefly, thanking the Association for his election to the office of Second Vice-President.

MR. GOOD.—I have very little to say on this occasion except to cordially thank you for the honor conferred. I cannot claim that I am not able to express my views on any subject that may come up. I have often thought that I was one of the few at the meeting who should keep their seats, when others had the right to speak; but I have hopes of checking up on other occasions. I have had my say this time, however, and am willing to admit it. I will simply say now that I am very happy indeed to have been selected as one of the attendants on our old friend, the Nestor of Pharmacy, Alfred B. Taylor, and in selecting him for your President I am confident that to-day the shades of Parrish, Procter and Painter look down with approval.

MR. REMINGTON.—I would call attention to the fact that the good man who has just spoken, and the other one, both St. Louis men, are from the State of Pennsylvania.

MR. ALEXANDER.—It is unnecessary to introduce Mr. Maisch.

MR. MAISCH.—Mr. President and Gentlemen: It was in 1857 that I first attended a meeting of this Association. I was then a younger man than I am at the present time. They put me to work soon after in various directions, and finally, in 1865, selected me, in Boston, as Permanent Secretary. I have held that place ever since; and, notwithstanding, I have recently again presented my resignation to this Association, it has been rejected. I assure you that I will discharge the duties of the office with the same fidelity that I have done in the past.

MR. SHINN.—It is very rarely that we have elected two such veterans to office in this Association, and I therefore move that we give three rousing cheers for the veterans from Pennsylvania.

The Association gave a hearty response. The Treasurer, Mr. Sheppard, was introduced.

Mr. Sheppard.—I thank you for this renewed expression of your confidence, and can only say that I will during the coming year, as in the past, endeavor to conscientiously perform the duties of the Treasurer's office. I desire also to thank the members of the Association for the prompt remittance of their dues during the past year. I think that if those who are present could look over the list of membership, and see how many members have paid for the year 1890, they would be very much gratified at the result.

Mr. Finlay, the Local Secretary, was next introduced.

Mr. Finlay.—I thank you for this evidence of good-will towards me, and I can assure you that I will do everything in my power to make our next meeting a great success. Having the best material to work on, I know that when you have been among us, you will decide that it was good for you to be there.

Mr. Remington read the following telegram:

"Glen Summit, Pa., *September* 10, 1890.

"In conformity with the action of the American Medical Association at Nashville, your Association is invited to send delegates to attend the meeting at Washington in 1891.

"(Signed,) Frank Woodbury, *Chairman*,
"*Com. on Materia Medica and Pharmacy, A. M. A.*"

Mr. Remington also read a letter from Dr. Woodbury, expressing the hope that the American Pharmaceutical Association would send twenty-five or thirty members, who will all promise to contribute to the proceedings of this new Section, and make it a great success, and presented the following resolution:

Resolved, That in response to the invitation of the Chairman of the Section of Materia Medica and Pharmacy of the American Medical Association, there be appointed by the President of this Association twenty-five members, who shall serve as delegates to that Section of the American Medical Association at its next meeting in Washington in 1891.

Mr. Whelpley.—One suggestion: as it is quite desirable that as many of these twenty-five shall go as possible, I think it would be a good plan for those members appointed delegates to notify the President.

Mr. Remington.—It was the design of the resolution to give the President time to hear from members when invited. There is the invitation to members of this Association who can go and who can act, and it seems to me that this is the opportunity we have been waiting for so long The door is thrown wide open, and we can enter under the best possible auspices. The President of the Section has given this invitation, and we should send such a representation there as will give a good impression of pharmacy. It seems to me that it is right for the National Association which represents Pharmacy and the National Association which represents Medicine to meet together, and it is evident that the President of the Section has taken the same view, for here is his invitation for the American Pharmaceutical Association to accept. As this is the first meeting of the kind, I sincerely hope that the Committee of twenty-five will be members of the Association who are workers and readers of papers, etc., who will make a very favorable impression at this initial step. This is the Section of Materia Medica and Pharmacy. The Secretary of the Association, Dr. Atkinson, informed me that it has all the rights and privileges that any other Section of the American Medical Association has, which is quite a compliment. We do not go there as secondary to the physicians, but meet there as equals.

MR. HAIGH.—I would inquire whether this includes the sending of delegates by State Associations, or whether the American Pharmaceutical Association alone has the privilege.

MR. REMINGTON.—I have not been informed further than the telegram and letter which I have read. We will be advised as to that later.

MR. HAIGH.—Several State Associations have appointed delegates to this Section, taking it for granted that the Section was open to delegates from every Pharmaceutical Association in the country. It would be a good plan if some communication were made to the State Associations, so that if they have the privilege they could take advantage of it.

MR. MAISCH.—The only way is for the committees of the State Associations that have been appointed to address Dr. Woodbury, the Chairman of the Section.

MR. HAIGH.—As this Association has taken the primary step, I think they might notify the State Associations.

MR. REMINGTON.—I think Mr. Haigh will be satisfied with this arrangement. Dr. Woodbury has asked me, I see by reference to his letter, to meet him in conference three weeks from now, and I will present the matter to him, and if he has the power conferred on him to invite delegates from the State Associations, I am sure he will be very glad to do so; and, in that case, I will recommend him to advise the Secretaries of the State Associations that the American Medical Association would like to receive their delegates.

THE PRESIDENT.—I would suggest that, in order that the Committee may appear in full strength, they have the power to fill any vacancies occurring in their number.

MR. SIMMON.—I think we already have a committee of five appointed for a similar purpose. Wouldn't it be well to have a committee of twenty and add that five, so that the resolution will not conflict ? I will make a motion to that effect.

Mr. Remington having accepted the amendment, the resolution was adopted.

Mr. Good presented the following, which was adopted :

Resolved, That a vote of thanks of this Association be extended to the Local Secretary and Committee of Arrangements for their efforts in providing for our comfort and entertainment; for the courtesy extended to us by the Old Dominion members of our Association, and also to Lieutenant-Colonel Frank, of Fortress Monroe.

Mr. Diehl was introduced to the meeting, and thanked the Association for his re-election as Reporter on the Progress of Pharmacy.

Mr. Markoe presented the following, which was adopted :

Resolved, That the thanks of the Association are due, and are hereby tendered, to the retiring officers for the able manner in which they have conducted the affairs of the Association during the past year.

Attention being called to the amendment to the By-Laws offered at the second session, relative to the restoration of an admission fee, Mr. Ebert requested that it be laid over until the next meeting.

The Minutes of the last session were read and approved.

Mr. Remington stated that the Association was not informed of the exact date of the meeting of the American Medical Association; and since it was very important that a strong representation from this Association should attend that meeting, without decreasing the attendance at our next annual meeting, he moved that the Council be given power to change the date of the next meeting so as not to clash with that of the American Medical Association. The motion was duly seconded and adopted.

On motion of Mr. Ebert, the Association then adjourned, to meet again in the city of New Orleans on the first Monday in May, unless otherwise decided by the Council.

JOHN M. MAISCH, *Permanent Secretary.*

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST SESSION.—TUESDAY AFTERNOON, SEPTEMBER 9, 1890.

Promptly at 3:15, Chairman Eliel called the Section to order; Secretary Kilmer was absent.

The Chairman read the following address:

GENTLEMEN: Again we meet to discuss ways and means to eradicate objectionable features which present themselves in our every-day business experience, and to maintain our establishments on that profit line which is so necessary to our success.

Our efforts to abolish the Special U. S. Liquor Tax have failed, and in the light of recent Congressional legislation, further waste of energy in that direction would be useless.

The proprietary pharmaceutical preparations flourish in the land and grow with amazing rapidity, to the great detriment of legitimate pharmacy, and should receive the special attention of this Association. In connection with this I would suggest that a Special Committee be appointed to attend the next meeting of the American Medical Association, and to ask their assistance in checking this great evil.

Our special attention is called to the cutting of prices on proprietary articles and staple drugs, an evil which seems to spread more and more with every year, and in connection therewith I call your attention to the very vigorous circular of the Ramsey Co. and Minneapolis Associations of Pharmacists.

The Rebate Plan is the sponsor of the Cutter, and we must insist that the jobbers protect their legitimate customers and distributors.

I desire also to again bring up the matter of insurance. Statistics fail to show the justice of the great discrimination against drug risks, and your Chairman suggests that a committee be appointed to look up the matter of mutual insurance and report at the next annual meeting, or sooner if practicable.

On motion of Mr. Whelpley, the address was referred to a committee of three for consideration and report. The chair appointed Messrs. J. W. Eckford, Arthur Nattans and Henry Canning said Committee.

The following joint address, referred to by the Chairman, was then read:

JOINT ADDRESS OF THE RAMSEY COUNTY PHARMACEUTICAL ASSOCIATION AND THE MINNEAPOLIS PHARMACEUTICAL ASSOCIATION.

To the Manufacturers, Proprietors, Importers and Wholesale Agents of all Proprietary Medicines usually sold by Retail Druggists in the United States:

GENTLEMEN: There are in many cites and large towns in this country, certain establishments known as bazaars, fairs, department stores, etc., which establishments deal in dry goods, toys, baby carriages, and general merchandise, and whose chief aim seems to be to build up themselves by tearing down everybody else. The chief effect of the methods adopted by these establishments is to demoralize trade generally, and more particularly the proprietary medicine business. They buy proprietary medicines, perfumes and proprietary articles in large quantities, at the very lowest rates, and sell them at retail, at cost or less, solely as a means of advertising and drawing customers for their other business.

Now, gentlemen, we submit to your careful consideration, as business men, the question whether, in your judgment, this state of affairs can result ultimately, in anything else than the utter demoralization of the entire proprietary medicine business. We think it will so result. You must certainly see that it is a great injustice to us, and that it is to the interest of all druggists to work against the sale of all those proprietary articles whose manufacturers refuse to protect us in a living profit.

You cannot be unmindful of the fact that you made use of us as the medium through which you were enabled originally to introduce your goods, and that you still rely upon us as the chief, and in most localities, the only medium through which you can reach the public. Indeed, it would be almost impossible for you to reach the consumer with your goods without our assistance. We think it exceedingly unfair that the druggists should now be compelled to sell your goods without a cent of profit, or let them rot on their shelves, simply to gratify a few outsiders who make use of these goods for advertising purposes. No more of your goods will be sold on account of the cut rates. On the contrary, you will sell less of them than you would if their sale was confined to regular pharmacists, and the full price maintained. The very fact of their being used by these outside parties as an advertising dodge tends to drag them in the dirt and lower their reputation in the estimation of the public. Those who cut prices, so far as the druggists are concerned, are the very ones who substitute most, and run in other articles than those that are advertised.

It may be interesting now, to some of you, to sell large quantities of your goods to these sharks, who sell them at retail for less than we can buy them, in such quantities as we are likely to need of them—but by-and-by it may not be so funny. We predict that the time is near at hand when you can no longer use us as the distributors of your goods unless you protect us. The pharmacists and druggists are the only natural and legitimate distributors of proprietary medicines, and if they cannot sell them at a living profit, they will be forced to discard them entirely and substitute like preparations of their own manufacture.

We believe that by the united and active co-operation of the pharmacists, we can make it exceedingly difficult, if not impossible, for any one to float any proprietary medicine, no matter to what extent it may be advertised. There may be some lack of co-operation now, in some localities, but a common grievance will unite us in a common effort for redress.

Each pharmaceutical association, or the combined pharmaceutical associations, may be compelled to have analyzed the principal proprietary medicines whose proprietors fail to protect us, and publish to the world the formulas of such articles; and get up similar preparations of their own, and unitedly advertise them as extensively in every locality where such preparations are advertised. We think we can find a way to buck every proprietary medicine whose proprietor refuses us protection.

We believe, gentlemen, that the remedy for this grievance lies entirely with you; and unless you take measures to protect us, we will take measures to protect ourselves against the inroads of these enemies of our business. We are willing to co-operate with you, but we are not willing to buy and sell your wares at cost, or to buy and sell the wares of any of you who suffer your goods to get into the hands of these pirates.

You cannot reasonably expect to distribute your wares through us, unless you protect us in our legitimate profit. These articles are now sold by us at as low rates as we can afford to sell them, and many of them do not afford us profit enough.

We do not propose longer to be the blind dupes to aid you in storing up magazines of ammunition to be fired at us by the enemy. You *can* stop this business if you will, and you *must* do it or we will cease to sell your goods. It will not do for you to say to us, "Send us the names of these cutters, and show us where they get their goods, and we will stop it," and then go yachting, leaving us to take care of ourselves as best we can. We will send you the names of the cutters, so far as we know them, but it is your business to ascertain where they get their supplies, and stop it. It is sufficient for us to know that your goods are in the hands of cutters. It is our determination to wage unceasing war against every proprietary medicine found in the hands of cutters, regardless of how it got there. You hold the key to the situation, and you must lock them out.

We hereby earnestly request all manufacturers, proprietors, importers and wholesale agents, of proprietary medicines in the United States, to take measures at once to prevent their goods from getting into the hands of cutters of every name and description.

We respectfully suggest that this can be done by your refusing to sell to any one but regular pharmacists and regular wholesale druggists of good standing and honor. We recognize the wholesale druggists as the natural distributors of these articles to the retail druggists, and we believe that they are willing to co-operate with you and us in stopping this piratical business, and we request that you allow them a fair and reasonable profit.

We request that you sell only to regular pharmacists and regular wholesale druggists, and in such quantities only as they can dispose of in a regular and legitimate way; and that you take written pledges from every person to whom you sell your goods, whether wholesale or retail, binding them under forfeiture not to re-sell them to any person, either directly or indirectly, who cuts the prices—or to any person or persons, other than regular pharmacists and druggists; Provided, however, that we have no objections to your selling to general dealers, in reasonable quantites, under proper restrictions, in small places where there are no regular druggists. This is a friendly communication. A word to the wise is sufficient. We hope you will not compel us to resort to more extreme measures.

The foregoing address was unanimously adopted at a joint meeting of the Ramsey County and Minneapolis Pharmaceutical Associations, held in the City of St. Paul, on the 11th day of June, 1890.

[OFFICIAL.]

Ramsey County Pharmaceutical Association.	*Minneapolis Pharmaceutical Association.*
L. MUSSETTER, *President.*	FRANK H. SCOFIELD, *President.*
S. R. MCMASTERS, *Secretary.*	EDWARD SHUMPIK, *Secretary.*
Address: *St. Paul, Minn.*	Address: *Minneapolis, Minn.*

The communication was submitted for discussion.

MR. SEABURY.—The proposition of the Ramsey County Pharmaceutical Association amounts to this: They go over the ancient history of cutting, which we all know by heart, and then they proceed to make the threat that any manufacturer who sells to any of these department stores, or stores other than legitimate druggists, will have his goods boycotted and substituted by others, and that they will do all they can to intimidate the manufacturer. Now, that is the gist of the matter. If they can afford to do that, all right. They sent such a letter to our concern, and I instructed Mr. Peters to reply, that the firm was already on record as never selling to any but retail druggists, and, if I had my way, I would try and induce all the rest to do the same thing. I have sold to nobody outside of a legitimate druggist, and I never will.

MR. NATTANS.—Do you concede your goods can be bought by cutters the same as anybody else's?

MR. SEABURY.—You can answer the question. They get them from everybody.

Do you remember the time we had the Campion plan in operation? There were lots of men in that plan that were supposed to be honest; and when I found out they were dishonest, I withdrew and kept my own special Campion plan, as I always propose to do. You will never be able to do anything with the manufacturers who put up packages that can be sold by anybody, until you stand together like a Roman phalanx, and each one for himself, and act honestly by each other. When that time comes, you will be able to knock out all this cutting business. Take, for example, the bricklayers; two or three dozen of them will stand together, and not a man will budge; but take an educated class, that ought to be entitled to a respectable compensation, based on intelligence—they work cheaper than a laborer, even to this day. I had applications from several State Associations to help them in this matter, and I said to them I would put the armor on in time and go through the same work, provided they would unite like men.

MR. NATTANS: Isn't it a fact that the retailer was not the cause of the failure of the plan? I took an active interest in it, and remember distinctly that it was by the wholesaler, and in the very city of New York, that the whole plan was killed. The blame for its being killed does not belong to the retailer. I think it might have been carried successfully but for the wholesaler.

The Chairman caused the following letter to be read:

LOWELL, MASS., *September* 3, 1890.

MR. LEO ELIEL, *Chairman Section Commercial Interests, American Pharmaceutical Association, Hygeia House, Old Point Comfort, Va.*

DEAR SIR: Your esteemed favor of August 22, addressed to Dr. R. V. Pierce, has been referred to me for reply, as Dr. Pierce does not return to Buffalo until September 10th. As Chairman of the Committee on Trade Interests of the Proprietors' Association, it has been my privilege for some years to witness the workings of the various plans which have been projected for the suppression of cutting prices on proprietary goods, and to note the many obstacles which have prevented their successful working. It has always appeared to me that a very large majority of both proprietors and jobbers were not only willing, but anxious, to adopt and enforce any practical scheme that would result in driving the business of the aggressive advertising cutter out of existence.

At a meeting of the Proprietors' Association, held in New York city, November 15, 1888, where it was my pleasure to represent the J. C. Ayer Co., it became my duty, as Chairman of a special committee, to prepare a resolution which should express the sentiment of the Convention on this subject, and the following was unanimously adopted:

"*Resolved*, That it is the sense of this meeting that, as a matter of simple justice to the retail trade, proprietors should decline all orders for quantity lots from persistent advertising cutters, whose policy is to use the extra discount, not for profit, but as a means of advertising their retail trade, selling at cost or less, to the annoyance and injury of legitimate druggists, who purchase in the usual quantities required by retailers."

Again, at a meeting of the N. W. D. A. held at Indianapolis, Ind., October 22, 1889, the same resolution appeared in a petition to the proprietors, signed by nearly all the leading wholesale druggists in the country, asking that the proprietors refuse to fill orders, except from the legitimate wholesale trade, and that a list should be agreed upon by the proprietors, and that they should bind themselves not to fill orders from any party not on that list. It now remains for the Proprietors' Association to take action on this petition. That they are willing to do, and will do all that in them lies to deliver the legitimate retail druggist from the hands of the cutter, I am fully persuaded and I sincerely hope that the efforts of the wholesale druggists and proprietors will have the hearty co-operation of the retail druggists. There must be unanimity of purpose, and concert of action. The J. C. Ayer Co. have tried, and will continue to try, because they believe it is right, to prevent their goods from falling into the hands of known cutters.

It seems to me that the pharmacists assembled in convention at Old Point Comfort should formulate and unanimously agree upon a plan which, if practical, will receive the cordial endorsement and support of both jobber and proprietor, and that they should present the result of this action in a circular of appeal to their brother druggists throughout the country, urging upon them the necessity of united effort in sustaining it. The mistakes of past efforts to solve this perplexing question will enable you, in the preparation of a new plan, to avoid the rocks upon which others have split, and to evolve a scheme which will command the support of all whose interests are affected by it. I would also suggest that the result of your deliberations be submitted to the N. W. D. A., and also to the Proprietors' Association, requesting them to act with you. It might also be well to consider the petition of the N. W. D. A., above referred to, endorse it, and present it to the Proprietors' Association, which meets in Washington late in September. With the retailer, wholesaler and proprietor working together for a common purpose, it would certainly seem as if a more satisfactory condition of things must result.

Very truly yours, E. A. BIGELOW.

The Chairman suggested that the letter might be referred to the Committee on the Chairman's Address.

MR. CANNING.—While that is an easy disposition of this matter, how is a committee of three appointed this afternoon, to report this evening at the next session of this Section, any plan by which we can succeed in putting a stop to cutting? It is an utter impossibility. It seems to me that the only way we can get at anything definite and formulate a plan at this meeting is by a thorough discussion of the subject in open session. The committee can do nothing. While I do not want to stand as the champion of the proprietor by any means, the whole question is comprised in a nut-shell in the last sentence of the letter which has just been read. Something can be done if the proprietor, jobber and retailer will work together. Now, unless we find something wherein the proprietor, retailer and jobber will work unitedly, we shall do nothing. It will be mere wind and time wasted. There is no doubt in my mind to this day that, if the Campion plan had had the united support of all three interests, it would have been in existence to-day, and would have been a complete success. I differ with my friend Nattans. He says that the retailers had nothing to do with the failure. I think, however, that the retailers themselves were very largely to blame, according to my experience. As I was very intimately associated with the getting up of that plan, I know wherein some of the loopholes were found; the retailers themselves helped to down that plan, and the jobbers also; I will not say but what the proprietor did, too. Instead of having the support of all three, it had the contrary from the black sheep in all three. We have had this thing on hand now so long, that the time seems to have come when we can unite, that each interest will agree that it is a detriment to their trade to allow this cutting to continue any longer. Until we are all combined, and the interest of one becomes the interest of the other, we shall accomplish nothing. It seems to me that the time has arrived when some united action might be taken by all parties concerned; and I don't know even then but what we might find the black sheep. It is very tempting when a man who has plenty of money behind him marches in and plants down his cash in advance, and very hard for a man who is looking for dollars and cents to refuse his order. That is where the trouble arises. But, if we can devise some plan which will unite all three interests, and enable them to stand together, there is no doubt but we can end the difficulty. I hope to hear this matter discussed in open meeting.

THE CHAIRMAN: It was not the intention of the chair to cut off a discussion of the question at all, but to get all the papers bearing on the subject into the hands of the same committee, because that is where I think they properly belong. The chair is willing to entertain any motion or suggestion that may lead to a solution of the problem.

MR. CANNING: I want to say, as one of the committee, that at present I can see no possible way for this committee to bring in any practical suggestion. The papers may be handed in, but certainly not with that expectation, unless it be based on what may be brought up in open meeting. There is no objection to taking the papers, but it should be understood, so far as I am concerned, that I can see no practical plan as yet.

I would say, further, regarding the Ramsey County Association's letter, which has been brought up here, that we may agree with many of their sentiments; but I do not like this spirit of boycott myself, and there is this objection to their mode of procedure—they simply say to the proprietor, as I remember the letter, "You must keep your goods from the cutter." Now, that is easier said than done, so far as the proprietor is concerned. I do not wish it to be understood that I am standing up here as the champion of the proprietor by any means, but I do want to see justice done to all. How is the proprietor going to prevent his goods getting into the cutter's hands when he himself doesn't sell them? They don't go direct. There are many of the proprietors to-day who will not sell their goods to cutters, but "they get there just the same;" and that is further proof of what I have said, that you must have the united support of all three to effect a remedy. Now it seems to me that the best way out of the difficulty, and perhaps the only way that suggests itself to me, is to have a conference of able men on the subject, representing all three organizations, the American Pharmaceutical Association, the National Wholesale Druggists' Association, and the Proprietors' Association. Let them confer together and see if they cannot bring about something that we want. It doesn't seem, up to this time, that either of them can do it alone, for that has already been tried by each of them. We have also tried, in one sense of the word, a conference before, but the time may be ripe now for something better, and in that way we might be able to solve the difficulty.

MR. MAIN.—As one of the representatives of the National Wholesale Druggists' Association, I would say that in my opinion the remedy for this matter may be found in the direction outlined by Mr. Canning. There are proprietors in that Association who distinctly refuse to sell their goods to cutters. There are jobbing druggists who also refuse to do so. Now, the Proprietors' Association is a small body, comparatively, and the National Wholesale Druggists' Association is a small body; but the great trouble with the retailers of the United States is, as Mr. Seabury has stated, that they are not organized, and have never taken united action in any direction.

As to what Mr. Canning has said regarding the Campion plan, it is undoubtedly true. It was not that the proprietors threw up the sponge until they discovered that their goods were getting into the hands of parties that they had cut off, through the retail druggists. Mr. Canning was on that committee, and there are several others here who went through all that trouble, and I can assure you, gentlemen, that that is the case. We did not become disheartened in a day. We lost thousands of dollars individually, and hundreds of thousands in the aggregate, since that time, through enemies that were made in consequence of cutting off their supplies of goods from men who had been their customers for years; but when we found the retail men were supplying the jobbers in New York City and elsewhere that we had cut off, we said, "What is the use of our going to all this trouble? If we are not supported by the retailer, we must give up the fight."

Whether a plan can be outlined which will secure unanimity of action in the drug trade, I do not know. I do not think that unanimity of action can be obtained as suggested by Mr. Canning. I think there are enough retail stores who will continue to sell all kinds of goods. But there is another question that Mr. Canning's proposition covers that is a practical one, and that is, that it is to the interest of the proprietor, of the jobber and of the retailer, that these goods shall be sold only in legitimate channels, and at a legitimate profit; and it seems to me that if the retail druggists of this country are business men, as they should be, that from a conference of the three Associations some plan might be originated which would bring forth the desired result.

In regard to the proposition of the Ramsey County Association, several instances have been brought to my notice in which proprietors have been informed by that Association that certain of their goods were in the hands of cutters, and in one or two instances the Association has named the jobbers through whom they supposed the supplies were obtained. In each instance the proprietors have corresponded with those jobbers and received the assurance, in some cases, that they never sold the goods in question, but that in future they would decline to fill all orders for proprietary goods from the parties mentioned.

MR. CANNING.—I would like to mention two instances that I am able to call to mind, in which the proprietor can control his goods—one being the goods of the Pomeroy Pharmaceutical Company, and the other the Earle & Wilson collars and cuffs. These latter cannot be bought at any place in the United States at less than the prices dictated by the proprietor, and it is very singular that the proprietor cannot arrange some plan to protect the retail druggists and control his products.

MR. MAIN.—I think the proprietors will be found willing to secure the desired result. But what might apply to collars and cuffs might not apply to pharmaceutical preparations, except like those of the Pomeroy Pharmaceutical Association, whose business is large enough to warrant the plan. It might prove successful if applied to a large business.

MR. SEABURY.—This is not the first time that the ideas and wise counsels of our friend Canning have been heard, but it seems to me it is only by a tripod agreement that you can succeed. That is the ground we took five or six years ago, and while two parts of that triangle did honest work, the third one did not; and for that reason I think it is simply a waste of time to attempt to get at a solution of this question, unless we have some assurance that the retail trade will stand together as a unit. They can dictate terms to their wholesale dealers; they have the power; that has been pointed out to them for more than three years past. But what can you do when the mixture won't mix ? And until you do that, mark my words, you will never accomplish anything. All your fancy agreements don't amount to the paper which they are written upon.

As to boycotting a concern on the basis of the plan suggested by the Ramsey County Association, how do you know but the manufacturer may be entirely innocent as to supplying goods found in the hands of a cutter, as Mr. Main explained a moment ago ? I don't believe there is a man at this meeting who knows more about the eccentricities of the Campion plan, and the ways of the men who tried to circumvent good, honest schemes, than the three of the Committee who saw where the goods went to, and discovered the men who supplied them. In nine cases out of ten the agreement-breaker was the retail druggist himself; whether he was actuated by jealousy or not, we will let his next corner competitor say. But we have not been altogether unsuccessful. The work that was started four or five years ago has borne splendid fruit. I do not think that it will be found in Washington, New York, Brooklyn, Boston or several other cities, but who is to blame for it but the retailer himself? These are facts, and they can be substantiated. There are lots of smiling villages and towns, and even cities, in this country where pharmacists are getting full prices for everything which they are entitled to. They are entitled to a livelihood as much as anybody else, but what do they generally do? The moment some one comes along and starts in to sell an article for a few cents below the price of a ten-gross lot, they must make a break and do likewise. In such a case, why don't those who believe in maintaining the proper standard lock hands, put one of their own Association stores right alongside of the cutter, and cut the cut out of him? That's the way to do it. That remedy has been tried. It is known as the heroic treatment, and that is the only kind of treatment to apply to cutters. Your theorizing and talking to manufacturers amounts to nothing. Some will act with you, others will not. If you can get the Proprietary Association and the National Wholesale Druggists' Association into line, they will act; and if they do, then bring up your phalanx, the fighters who make the others work, and, depend upon it, if you stand firm you will never have a fight on this point in this Section. But, until you do unite, you will never get relief. I know of no branch of business in this country that is in such a low condition to-day as that in which we are engaged, and I say it in such a way that it pains me to think that we have not become aggressive.

MR. SAYRE.—I was in business right in the midst of the Campion fight, and within a stone's throw of persons who sold articles at a low figure. I like to hear Mr. Seabury talk, and he gives me a good deal of encouragement sometimes, but when he gets through I think I would like to ask him a few questions. He is familiar with the Seabury plan. He knows its workings, and he knows where it has been applied. I am aware of its having been put into operation, but I would like to ask him to give an instance where that plan has been successful. Now I am asking for information, not offering criticism at all, but I have learned from certain places where this question of cutting has been very much agitating the minds of pharmacists, that this plan of cutting the cutter was tried and proved a perfect failure. Can Mr. Seabury give the history of any case in which the cutter has been cut out, by this plan or any other?

MR. SEABURY.—I know of one, Bethlehem, Pa., where they tried it. They also tried it in Chicago, I believe. Mr. Ebert will be probably able to enlighten us as to that.

MR. HALLBERG.—The only heroic remedy ever tried in Chicago that has been effective is for every man to join hands in fighting the cutter, and to hold up prices. That proved effectual in Chicago.

MR. SEABURY.—The other is better, for the reason that where you take a city having four or five hundred pharmacists and only two or three cutters, it is better for the rest of them to remain quiet and submit to it, because there are many people who will not wear off two or three cents' worth of shoe-leather for the sake of buying an article a little cheaper. People won't go from one end of the city to the other in order to save fifteen cents. That has been tried, too. I do not think it is a good plan, because you make everybody a cutter, and everybody is somewhat loosened. It looks possible on the face of it, but it's not going to remedy the evil.

Mr. Hallberg.—You misunderstand me. I said that every man joined hands, and they kept up the fight, and the result was that in less than three years one cutter died, one was closed up by the sheriff after having run three stores, and one had to take out a five-hundred-dollar license because he sold liquor after midnight.

Mr. Seabury.—Then, so far as we are concerned, we are united on that; but if it is necessary to furnish you with further proof on that subject, I will look through some of the reports on cutting, for information.

Mr. Sayre.—How are they succeeding in Atlantic City at the present time?

Mr. Seabury.—We have been asked not to sell certain people there, and have agreed to refuse to do so.

I want to say further, that you are going to make a mistake if you overlook the fact that has been pointed out that goods in a scalping shop may have been sent to this very man by his neighboring druggist. Who knows? It is not always the jobber's fault. The great trouble is in relation to another point of weakness which I do not feel like speaking about on this floor, and that is, in large cities a number of retail druggists are not their own masters—they can be used as tools, and they have to do the work. It is a matter of self-preservation with them. Therefore, it doesn't follow that you cannot corral these men who are under obligations. You can get them into the Association just as quickly by a wholesale defensive movement as in the case of an assault, and if the distributors should attempt to do any mean work, it is very easy for the Association to take their trade from such a house and place it at the disposal of another. There is no question in this matter that cannot be cured, providing you unite and show your strength.

Mr. Eckford occupied the chair.

Mr. Eliel.—At the meeting of the National Wholesale Druggists' Association at Indianapolis, and also that of the Proprietary Association, I had the honor to represent the American Pharmaceutical Association, and I took it upon myself to do so more particularly in behalf of the Section on Commercial Interests, because I thought that was the Section chiefly interested in representation there. The National Association, I desire to say, with due deference to the members of that organization present, gave me but cold comfort. The only thing they said was, "Gentlemen, help yourselves, and then we will help you." The President of the National Proprietary Association said this: "The American Pharmaceutical Association is a representative body. You have some thirty-five or forty Associations in the various states. Come to us with a united request from these bodies, present a petition, or have them send representatives who are authorized to speak for these various State Associations as well as the American Pharmaceutical Association, and we will comply with whatever reasonable request may be made." Now that is the whole thing in a nut-shell. If we can unite on this question; if we can get the unanimous action of these State Associations in connection with that of the American Pharmaceutical Association, the battle is ours. Victory must perch on our banners, for how can they do otherwise than listen to our requests as long as they are reasonable? I think this whole matter of supplying cutters, and cutters obtaining supplies, lies within our own hands, if we can ask the proprietors to sell only to legitimate dealers and jobbers in such quantities as their legitimate trade justifies, and also ask them to demand of the jobbers that they sell only as the interests of legitimate trade require, and they can easily discover that. They can tell very soon whether a man is purchasing to such an extent that he cannot use his supplies legitimately. There is no speculation in proprietary goods. The price is the same all the year round. Why cannot we cut off the cutters? It is the rebate that they obtain which enables them to be cutters. Cut off the rebate, and the cutter will cease to exist. That is what we want to fight.

MR. WHITNEY.—I have just come in, and, therefore, I do not know what scope this discussion takes in; but on my trip to San Francisco last year I met some gentlemen from Chicago who gave me the idea of a scheme in which I think there is a germ of success—a scheme which has more value than anything of which I have yet heard. Mr. Hallberg is here, and I think it would be well to ask him to give us a description of the methods followed in Chicago. The fact is, the proprietary man gets us to buy his goods; we take them, and get ready to sell them, when we find the dry goods man and the general store man have those identical goods, and are selling them at a reduction. To say that they cannot get them is simply absurd. The idea of getting jobbers not to sell to any but pharmacists is futile. Now, as I have said, the Chicago scheme contains a germ for combating this evil.

MR. HALLBERG.—I would say in reply to Mr. Whitney that I don't know whether the Chicago plan contains the germ of preventing cutting in prices, but it does enable anyone who participates in it to buy goods at the lowest possible figure. It is simply a co-operative plan. It was first in operation about two and a half years. Ten proprietors, representing fifteen stores, form an Association, and one man does the buying. Weekly or semi-monthly meetings are held, in order to make up lists of goods that are required of such staple proprietary articles as they sell pretty largely, and so obtain the best discounts. The buyer receives and distributes the goods. The cost of distribution on this plan will not exceed two per cent., and, as an average discount of ten per cent. is secured thereby, a net profit of eight per cent. is obtained. The scheme worked so well in the two years and a half that it was extended to take in about thirty-five stores. Now, a difficulty arises that, while it was possible for one man to buy and distribute for ten stores, it is impossible where thirty-five stores are concerned. A plan will shortly be perfected by which this may be accomplished. The great merit of the scheme is that the druggist is enabled to buy his goods as cheaply as possible. Another advantage is, that if a party has a large quantity of cigars for sale, for instance, at a very low price, an organization like this can purchase the lot. The organization has often bought as much as 20,000 cigars, thereby saving 50 per cent. Another feature is, that this Association has undertaken to manufacture its own proprietary goods. They have now a list of about a dozen preparations, among which are a blood purifier, cough syrup, blackberry balsam, and liver pills. They have even invested $250,000 in soap mills, for the purpose of manufacturing a line of soaps of their own, which proved profitable, I presume. An extension of the Association is contemplated, which will finally embrace the larger number of Chicago druggists, each one handling the Association's preparations, which will ultimately take in all the preparations required to supply the ordinary wants of the community in the way of domestic remedies, and a great demand will undoubtedly be created for these goods. Of course, they are to be made under the direct supervision of the members of the company. They would bear the label of the company on them, and be provided with a circular, giving information as to what other articles this company prepared. This has worked, as far as it has been attempted, quite well, and I am satisfied that with an increase of membership the use of these articles will also be increased. Of course, these goods will be absolutely under the control of the Association, so that not a dollar's worth of them will go into the hands of any one who would be liable to cut. There is a much greater profit in such proprietary goods than in many others, and it is intended to extend this plan through the State of Illinois, and even beyond that in course of time.

MR. MAIN.—Mr. Eliel, I believe, has complained that he was not well received by the National Wholesale Druggists' Association. I am inclined to think there must have been some mistake in that, which probably arose from the fact that in that Association, as in this, the work is done largely by committees, and its Commercial Section was principally in the hands of a committee, whose Chairman was called away by sickness at the last meeting. I would like to state, however, that a resolution was passed last year to the effect that jobbers should refuse to supply cutting druggists, when they were warned they were cutters.

Mr. Eliel also states that the rebate plan is the cause of the cutter. He is mistaken in that, for before the rebate plan was ever heard of, cutting existed in the United States. There are gentlemen present who are doing business in Hartford, Conn., where at least ten years before the rebate plan was originated, cutting in proprietary medicines was carried on, in its worst form, and it was only ended after a number of years of suffering, by the retail druggists coming together, and agreeing as to the prices at which they would sell goods. Whether the plan they devised for mutual protection is in existence to-day I am not informed. In any event, the assertion that the rebate plan is responsible for the existence of the cutter is erroneous, and is not supported by the facts.

MR. NATTANS.—I think that the plan which has been evolved in Chicago is one that will probably lead to a practical solution of the question, and that is what we are after. The wholesaler and jobber tells you to organize thirty thousand retail druggists into one solid phalanx. To organize in cities where cutting is now at its flood tide, is almost an impossibility—how to organize under any circumstances in this country, which is wider than any civilized country on the globe. How are you going to do it? Such a proposition is simply impracticable, and should not be considered seriously. The Campion plan has been tried by men who earnestly attempted to carry it through to success, and they failed. I will not attempt to go into details of the cause of the failure. But it has been shown conclusively, I think, that the retail trade cannot be organized by the American Pharmaceutical Association or any branch of it; or any association existing in any State or any large city. You may possibly organize in smaller towns, in a single county, or in some place where you have no active opposition to contend with; but not where the almighty dollar is invested as it is in our city. I am now speaking from the standpoint of a cutter, having been forced into it against my will by circumstances, and I say from that point of view it is an impossibility, and you need not try it. There is only one plan besides that presented by the gentleman from Chicago, and that is the plan of substitution, by manufacturing and selling your own goods in place of the proprietary goods which you now handle for profit, thereby compelling not the retailer, but the gentlemen who at present make all the money on these goods, to find a plan for the prevention of cutting. A firm has been cited here to-day as an instance of a concern that is able to control proprietary goods, of which I have some knowledge. I refer to Earle & Wilson. They control goods which are just as much proprietary goods as any on your shelves, and the prices are regulated as Mr. Canning has stated. The only difference is that they make a line of goods which are continually changing in fashion, in consequence of which the retailer of them in time accumulates a certain amount of dead stock. Now, if Earle & Wilson protect themselves and their retailers, why is it that men who make patent medicines for everybody, which we are compelled to sell without profit, cannot formulate a similar plan? Why is it that we have to invent one for them? Why is it that we are asked to do an impossibility? for that it is impossible has been demonstrated.

Now, I wish to take the bull by the horns, give up the idea of uniting thirty thousand druggists, which is utterly impossible, and try to get at something feasible, some method which will compel the manufacturers of these nostrums to protect themselves. Don't be afraid that the trade is going out of your hands. I don't fear that at all, for people will go to the druggist to buy drugs and medicines for a long time to come, notwithstanding any effort which may be made by the manufacturer to prevent it. These goods were to be found long before the Campion plan was thought of, not only in the drug stores, but in dry-goods stores and stores of all kinds all over the country. There had been no attempt to protect the druggist before the Campion plan was brought forward; they were sold for the dollars and cents that were in them.

The sooner we come down to the fact that these goods will be sold by such stores, the sooner we will arrive at a practical scheme of protection. The only plan which will protect is by union, by making and selling goods in place of those which you now sell for nothing. That is my idea, from the position of a cutter. Having found myself on a business street, with a very large rent to pay, with people around me cutting and slashing, what could be done? I ask any business man here. You certainly would not stay there and allow others to do your business and compel you to shut up shop. They had to get low prices in order to exist. I say again that the remedy does not lie in the nonsensical idea of forming a phalanx of thirty thousand druggists scattered over the Lord knows how many square miles, but in making the goods in your communities, and distributing them at the lowest possible price in place of those which you now keep. That is one of the plans which will compel the manufacturer to find a way out of this dilemma.

MR. KENNEDY.—I have no doubt we have all listened with a great deal of pleasure to the last remarks, but I don't believe in a member of this Association telling us what we cannot do. Show us what we can do. The gentleman who has referred to the Earle & Wilson arrangement says you can not organize thirty thousand retail druggists in the United States. Well, I think if you go about it in the right way it may be possible. There are more than thirty thousand furnishing-goods stores in this country, and yet Earle & Wilson are able to control their goods. Why? Because all those furnishing-goods men support them. That is the secret of it.

MR. NATTANS.—Earle & Wilson simply sell to the retailer, and their goods are not handled by any jobber. A jobber cannot buy them at any price. Their goods are sold direct to the retailer only, and if a dealer should sell one of their collars for less than its regular retail price, he would be unable to buy any more. That is the protection they have adopted for their own goods, not for the benefit of the retailer.

MR. KENNEDY.—I am very glad to be informed as to that, and I say let the proprietors do the same as Earle & Wilson. This begins to show us a possible way out of the difficulty. I am not sure whether the middle-man could be dispensed with, although Earle & Wilson seem to manage without the jobber. If a retailer in that trade is caught distributing their goods, he is cut off, and is unable to get any more goods. Now, it has been our claim for years that the proprietor controls the distribution of his goods. I freely confess I didn't know how the goods were controlled by Earle & Wilson. I still think it is possible to unite the thirty thousand druggists now. We thought so five or six years ago, and although the Campion plan was a comparative failure, it nevertheless effected a great deal of good.

MR. EBERT.—Mr. Hallberg has failed to give the real basis on which the druggists of Chicago are protected against cutters. The way it was accomplished was this: The druggists of one ward came together and said, "We in this ward will not sell goods for less than their market value or regular retail price," and they adhered to it. They formed the nucleus of the system now in use. This movement soon spread over the city, until nearly all the druggists of the different wards in the city united and formed the Chicago Retail Druggists' Association. There are 34 wards in Chicago, and each ward formed an organization, adopting a uniform constitution and by-laws, and elected a president, secretary and treasurer, and a committee of complaint and arbitration, consisting of three members. The dues are one dollar a year, fifty cents of which goes to the central organization. Every ward was organized in this way. They are represented in the central organization by one delegate to each ten members or fraction thereof, so that a ward having sixteen drug stores in its boundaries has a representation of two delegates in the central organization. The ward organizations meet once a month, while the central organization meets annually or oftener as required. This general organization was effected some four years ago, and to-day there is not a cutter in Chicago outside of the department stores. According to our arrangement, any complaint as to rate-cutting is made by the aggrieved party to the ward committee of arbitration. They investigate and take measures to prevent it. If a party in an adjacent ward causes the trouble, complaint is made to the committee of the offender's ward, thus avoiding any personal disputes.

Now, if we will only be reasonable and not try to regulate the trade scattered over an immense territory that we cannot reach or manage, but organize in the immediate neighborhoods in a similar manner as has been adopted in Chicago, and the success may be the same as there.

The cutting by these department stores does not affect the pharmacist to the extent as generally represented. There are people who will walk miles to buy an article for a cent or two less than it can be obtained for at a regular store, or will misrepresent to get a rebate. We do not want their trade; but we do want legitimate trade that comes to the druggist for such goods as he is supposed to keep. If we will only come together and act harmoniously in a business way, there will be no more cutting, we will get full prices, and place ourselves in a position whereby we can benefit ourselves and the profession of pharmacy. This is the Chicago plan.

MR. WILCOX.—We have had that plan tried in our place. Not long ago a dealer commenced to cut, and the Pharmacists' Association decided they would cut, too; and they put their goods down in such a way that he soon quit it.

MR. STEIN.—We controlled our trade until recently, when a cutter came to town. We first met him a little below his price, and then, as that wouldn't do, we tried the heroic treatment, and found that he was buying his goods from our store, and that he could buy them there cheaper than he could direct, and we had to shut down on that. We then formed a co-operative store, and retained all our prices at the stores; but some of our men, I am convinced, are weakening because we are sinking a little money. I don't know whether we are losing any great amount of money, but I have reason to believe that if our men will remain firm we will drive out the cutter in less than a year. Of course, it is only a branch of many stores controlled by one concern, but they have always their own preparations which they try to push. We sell them for less than they cost us, and they are greatly disappointed in not being able to sell those preparations, for those are the goods on which they make the money.

MR. WILLIAMS.—The way we are situated in Hartford, Conn., is this: We had been a happy family for over fifteen years, by reason of the druggists having combined to sustain prices, until some five months ago, when a large dry-goods concern of the city started out with a complete line of pharmacist's goods, some of which were rebate articles, and some not. The druggists at first attempted the heroic treatment of lessening the prices, but found they were losing trade, as the people would go to the dry-goods store, and buy the same things that they could get at the drug stores, when they could get them 15 cents cheaper. We then met their prices again, but still we didn't sell the medicines. The dry-goods stores of the country have a reputation, whether merited or not, of selling cheaper than others. Notwithstanding we have met the prices, the people still believe they can get bargains at the dry-goods establishment, and they go there and buy in large quantities. And here's another point. That large store belongs to a wealthy syndicate, the Scott syndicate, embracing four concerns, respectively located at Springfield, Providence, Hartford and Buffalo. They buy these rebate articles and divide them. Whether that is working on the rebate plan I don't know. They do not divide the profits, but the product, and therefore they are making ten per cent. even when they sell the goods at the dozen price or the gross price.

As to what Mr. Hallberg of Chicago has said about putting up the goods, that only brings the argument to this, they are selling only the regular advertised articles. Therefore, they are combining to make the articles to sell instead of all these goods.

Mr. Ebert.—I am not responsible for what Mr. Hallberg has said. That has grown out of the union of the Chicago Drug Association, and they have formed a company. I haven't had anything to do with it, for I consider it will finally become a species of monopoly, and I am no admirer of monopolies of any kind.

Mr. Williams.—Of course the goods made by that company have to be protected, otherwise some drug cutter will buy them and sell for less than the list price again. I take it, however, that this discussion is in relation to the rebates on largely advertised goods. It is in regard to these that the druggist needs protection, whether it be effected by combination or association. The only one who can bring it about is the proprietor. He can control that, as has been shown in the Campion plan, in the instances I have illustrated. I do not believe that these resolutions of the Ramsey County Pharmaceutical Association and others will accomplish any practical good. I believe we have to organize State by State, take these goods off our shelves and refuse to handle them, for if the dry-goods stores can sell them at a lower price than we do, people will go to them.

Mr. Seabury.—I fully concur in the views that Mr. Williams has just expressed in regard to the average New England lady, inasmuch as she is known as a great shopper. She would walk ten miles to save five cents, and is a firm believer in the theory that at these great dry-goods establishments job lots can always be had. The fact nevertheless remains that if we unite throughout the country in each community, large or small, the dictator will be the entire retail trade. Now, if I were to think this matter over a thousand years, I could never find a better plan than that which I have already suggested. The only question is, will you adopt it? If you do, you can go to every proprietary manufacturer in this country, and say, "We want you to protect us. We have united now, and we don't want you to sell to anybody except the legitimate wholesale trade." That is, under that tripod agreement plan, whereby morally the three factors are bound together, the manufacturer, the jobber, and the retailer. Now, the only traitors that will be found in that whole tripod scheme will not be so much among the manufacturers as among the other two parties to the agreement, and time will tell which has the greatest number in proportion. In case we found after a thorough trial of that scheme that the distributor is the only enemy of the retailer, and prevent him from keeping the goods from the department stores, the only remedy is to buy directly. Must the middleman go?

The Chairman.—I think you are wandering from the subject proposed, which is being merely discussed for the Committee's benefit. I do not think criticisms of any schemes would be in order. Every one has his remedy for that matter. We have gone into a discussion of various plans solely for the benefit of the Committee.

Mr. Main.—I wish to correct an erroneous impression that has arisen from Mr. Williams' remarks. The dry goods store in Hartford buys all its proprietary goods from the proprietor. From my position on the Proprietary Committee of the National Wholesale Druggists' Association, I am able to say that there are numbers of proprietors who absolutely refuse to fill orders from dry goods stores for goods. One other point, in reference to the remarks of our friend from Washington. His scheme, if I may call it such, if carried out, would simply result in the perpetuation of every kind of rate-cutting. His idea is to sell proprietary goods at low rates, in order to sell articles that he manufactures himself, and on which he obtains a good profit. I contend that that is all any cutter does in any part of the country.

Mr. Nattans.—The gentleman has left out one important point in my scheme, and that is, that the manufacturing and selling of preparations upon the plan adopted in Chicago, to answer the purpose of proprietary goods, does not perpetuate cutting. It will eventually protect the general pharmacist from the cutter, because it will compel the manufacturer to protect himself, for the reason that his goods have not got the sale that they formerly had, and I speak from practical experience. You can sell other goods if you try, as has probably been shown in Chicago. They first made one, and then another, and now they make a dozen goods. They wouldn't enlarge their list if they didn't sell them, and sell them at a better profit than they do proprietary nostrums. This is forcing the solution of these questions on the men who should and who can solve them; it is forcing the solution of the problem, not from thirty thousand, but probably one thousand. One thousand can be controlled, but thirty thousand cannot; and if the plan is followed, it would be liked by the manufacturer or by the jobber. As to the latter, of course it is impossible to speak definitely, because he will sell the crude goods from which these articles are manufactured; but the manufacturer, knowing that the druggist is the legitimate and sole handler of them to a large extent throughout the country, and knowing that other goods are being sold instead of his own, will naturally look around for a plan to protect himself, and he can find one. It has been demonstrated that it can be done with other goods, and I hold that he can and will discover some method—and that is the part that was left out by the gentleman who referred to my argument. My plan looks not to the perpetuation of the cutter, but to the protection of the trade through this channel, and not through endeavoring to organize thirty thousand or more druggists, which we have tried more than once thoroughly, and the Chairman of this Committee knows how utterly we failed in it. I was a member of the same committee.

Mr. Main.—I would like to ask the gentleman from Washington if he declines to sell proprietary medicines at cut rates at the present time. If not, I do not see that his position is by any means a correct one. I maintain that the construction I put upon his remarks is correct, and that to-day he is engaged in selling proprietary goods at cut rates, in order to attract custom to his store, to sell other goods upon which he can make a profit.

Mr. Nattans: That is a mistake. We are selling proprietary goods at cut rates because we are on a prominent street, and when we came there we found that our immediate neighbors, also on prominent streets, with heavy expenses, were doing the same thing; and we were forced, for self-protection, to do this, and not from an innate love of the practice.

Mr. Eliel occupied the chair, when the Section adjourned until the same evening at 8 o'clock.

SECOND SESSION—TUESDAY EVENING, SEPT. 9TH.

The Section was called to order at 8:30 p. m., by Mr. Eliel, who announced that the first business in order was the nomination of officers for the ensuing year.

Mr. Henry Canning was nominated for Chairman, by Mr. Redsecker; and Mr. W. L. Dewoody for Secretary, by Mr. Whelpley. Both nominees were duly elected.

MR. CANNING.—I thank you for the honor of this election, which I assure you was totally unexpected; but although I was unprepared to receive the office, I am not unprepared to work for the welfare of this Section, and to do all in my power to promote the interests for which it is organized, while acting as your Chairman.

MR. DEWOODY.—While I thank you for the honor conferred upon me, I fear that you are victims of misplaced confidence. Nevertheless, I assure you I will do my utmost to properly perform the duties which your election has imposed upon me.

Further remarks on matters of interest to the Section were invited by the Chair.

MR. EBERT.—I wish to say that the Section on Commercial Interests should try and infuse the proper spirit into the State Pharmaceutical Associations. Such Associations should have as a primary object the discussion of questions relating to pharmaceutical legislation and trade interests, and devote less time to scientific matters. I also believe they would do well to combine more social features at their gatherings; but above all let the principal object be the discussion of purely commercial topics, and I believe a greater amount of good will be done than is accomplished at present. Now, pharmaceutical legislation is needed in every State, and if members of State Associations will talk over these subjects, they will be able to find out what is wanted and needed by the trade. Pharmacists, like others, are in business to make money. Therefore, if the members of State Associations will come together, and talk about how to make money, and then from time to time, when any national movement for legislation or otherwise is needed, the State Association should present their plans to this Section of the American Pharmaceutical Association, where the same can be taken up and a united effort made to have the same adopted. But as it is now, at the meetings some one reads a very scientific paper, while the rest go to sleep, and we frequently hear the enterprising business man who stays away say, "If they would talk less of science, and more how to make money, I would attend their meetings and enjoy them." We have about thirty state organizations in this country, and they are most generally being conducted in this direction, discussing subjects that they might as well send to our Scientific Section for consideration. What is wanted is less science and more practical ideas of how to make money; and if you can infuse a little more of this into your state organizations, we will soon reach that millennium that we have been waiting for so long.

What caused the State Associations to spring into existence? The first object in view I presume was to get a State pharmacy law enacted, and the pharmacists of the State organized, worked and toiled until they accomplished that purpose. Now what these State Associations should do is not to stop because they have succeeded in obtaining pharmacy laws, some of which are probably very imperfect, but should meet every year and try and remedy the defects that exist in the laws. The members should discuss trade matters, how business can best be conducted under present existing conditions, and interesting and valuable discussions will be sure to follow—how to make money, and how best to do it. I know that a great deal of good common sense advice can be obtained from the men that know how to make money. That is the way to do it; and if we can get the State Pharmaceutical Associations to do this, instead of sending out proceedings of their meetings all over the land, filled with scientific matter, which is generally lost to science, it would be a better plan for these papers to be referred to the Scientific Section of the A. P. A. and read at the annual meeting of the Association where they would be of value and not be lost to science. The State Associations should only have practical objects in view, and discuss matters of live interest to the trade, and then they will have no reason to complain of a small attendance at their meetings.

MR. JAMES.—I agree entirely with the views expressed by Mr. Ebert. This matter of scientific papers is killing the State Associations. While reports come to us of meagre and spiritless meetings from various other sections, I hope I will not be considered egotistical if I allude to my own State (Missouri) as an example of what may be done by bringing the social features to the fore. At our last meeting, held in June at Excelsior Springs, there were four hundred members present with their wives and families. Whenever scientific papers were read, the audience would thin out, leaving some twenty members sitting there posing as scientists. The rest were enjoying the only holiday in the year which they got. The papers, as Mr. Ebert says, will be printed in the Proceedings. If any one is interested in them they will be found there. Therefore, the social and business features should be the principal aim of these Associations, for the purpose of rendering them popular, and making them a lasting success. I would say of the Missouri Association, that we have one thousand two hundred active paying members.

What is needed, as Mr. Ebert says, is to present a practical application of such things as every man learns in his business, or should learn, during the course of the year, so that others may follow in his foot-steps; or to register his failures—which are just as instructive as successes—that they may be avoided. Let the State Associations do this, and remedy the scientific-paper evil, and they will find their membership doubled in less than two years. They can have gatherings in which science and business have a part; but let them be largely social, and their membership will not only be increased, but every man will go away year after year more in love with his Association. Let scientific papers be read if they are desired. They are printed, and if a man wants to read them he will do so, but if he has no inclination in that direction you cannot make him. I know of no greater punishment that can be inflicted on a man than to compel him to listen to two-thirds of the papers read at these annual meetings. Therefore, the social and business features should be above all others in these Associations.

MR. FINLAY.—I cannot agree with the sentiments that have been expressed here, that the scientific features of such meetings should be subordinate to the social features. If there is to be any advancement it will be on the line of knowledge, and the only reason we have, to-day, any social structure at all, is because of science; and you will never have any structure worthy the name of an Association without science in the lead. If we hadn't had those scientific papers always foremost in this Association, how would it have been possible for the United States to have had such a great Pharmacopœia ? If Associations throughout the country, city and national, were held solely for the social purposes, and so-called trade interests, they would not have a very high standing, nor be regarded with very much respect. For my part, I would say that if an Association ignored the Scientific Department at its meetings, they would be almost valueless. We can get sociability at home, in our families, and can commune with each other, without getting up dances, receptions and similar enjoyments at our gatherings. That is no doubt very pleasant, but hardly profitable, and when men are stimulated to do work which advances pharmacy, the discovery and study of drugs, etc., then, and then only, will we advance. All civilization has been advanced by means of scientific discovery, and it is so with the advancement of Pharmaceutical Associations. When you throw aside their scientific features, I predict their death.

THE CHAIRMAN.—This discussion has only been taken up in order to give the Committee on the Chairman's Address additional time to complete their work. The report is now ready, and will be presented.

The following report of the Committee on the Chairman's Address was read, and on motion of Mr. Whelpley, received for consideration:

Your Committee appointed to report on the Chairman's address, beg leave to report as follows:

1. As to the first suggestion on "conference with the American Medical Association on the prescribing of proprietary pharmaceutical preparations," the Committee suggest that better results may be reached by individual work.

2. Your Committee recommend that on the question of "cutting of prices on patents" a conference be held with a delegation of the National Wholesale Druggists' Association and the Proprietors' Association, and that three gentlemen be appointed to represent this Association at said conference.

3. The Committee agree with the recommendations of the Chairman relating to mutual insurance, and respectfully recommend that a Committee of five be appointed to bring forth a feasible plan, to be submitted at the next meeting.

J. W. ECKFORD, *Chairman*,
HENRY CANNING,
ARTHUR NATTANS.

MR. MCINTYRE.—I think that the Committee has not, perhaps, given the first section mature consideration. We have succeeded in getting the American Medical Association to listen to us as to its relationship; and I think it would be better to go slow in the matter, and not divide our interests, but see whether the question of what the people want for medicine will not come up in a shape entirely different from anything we have had in the past. In the Pennsylvania Pharmaceutical Association, the committees having this matter under consideration have been in the hope that this Association would take some action looking in that direction, at least as a starter, whereby we would get a more definite view of what the people consider as medicine. We feel that there exist ideas in the practice of medicine which are entirely opposed to each other, and that the old class of existing patent medicines has been supplemented by another class manufactured under a patent, and by still another pushed as specialties, with the formulas kept secret. For that reason, I think it would be well for us to go slow, and see if we cannot convince the medical men that it would be wise to have something established in the nature of real medicines for popular use.

MR. ELIEL.—In regard to the so-called pharmaceutical specialties, I would say that in some cases the formula is whispered into the ear of the doctor, and put on the package in such a way that no pharmacist can put it up.

MR. JAMES.—As a member of this Association, and a practicing physician, I believe that Mr. McIntyre's words are entitled to a great deal of weight. I know that physicians are more and more inclined now to listen to the advice of the druggists, and I know also that there is a growing disposition for conferences, for an understanding with them. We have, as he says, been received by the American Medical Association. Several State medical associations have also taken steps in the same direction, and treated pharmaceutical delegations with marked courtesy. There is an increasing tendency in that direction, and I think that a little waiting, as Mr. McIntyre suggests, would be good.

Mr. Redsecker.—I have had some experience in the matter under discussion. I have taken to fighting not only patent medicines, but more particularly just such preparations as are alluded to here, and I have met with considerable success with our physicians. I dare to say that we can make just as good preparations as those of the so-called manufacturing pharmacists, and the result of it has been that we have measurably driven out of the market, as far as we are concerned, Bromidia, Listerine, Fellows' Syrup of Hypophosphites, and others, which we now make ourselves, and the physicians prescribe them. We make an emulsion of cod-liver oil, and physicians in our city prescribe Ross's Cod-Liver Oil Emulsion, because our firm is Ross & Co. I also use a formula that has been published in the Druggists' Circular, and is called "Bromadine," and now physicians who were prescribing Bromidia, having been sampled with it—as they are by the other parties—are prescribing Bromadine. The result is, we are selling hardly four ounces of Bromidia in a year, because they prescribe Bromadine. And it is similar with Lister's Antiseptic Solution, instead of Listerine, and with Compound Syrup of Hypophosphites. I have done this in a small way, and physicians have considerable confidence in it.

A manufacturing pharmacist sent his agent around our neighborhood, and he delivered to the doctors an ounce of fluid extract of ergot and phosphate of iron, and four ounces of beef and iron wine. No sooner had he gone than we put up four ounce bottles of these preparations, and sent them around to the physicians, and called their attention to our preparations. The result is, we sell none of their preparations, and only our own.

Mr. James.—You have found no disposition on the part of physicians to antagonize that?

Mr. Redsecker.—None whatever; they fall right in with us.

Mr. James.—There is one subject in which the physician lacks knowledge, and that is as to pharmaceutical matters, which are generally neglected as part of his education. It therefore becomes the duty of pharmacists to give instruction to the physician. Some physicians will not accept it, perhaps, because they consider themselves "the great I am, who knows everything." Those who are well educated and intelligent, however, are generally willing to accept the pharmacist's suggestions and instructions. I know many such in my own city, and I am very glad to say that they do not hesitate to come in and learn some valuable points in regard to medicine and its combinations. I think if pharmacists were to direct their attention that way, in endeavoring to complete the education of physicians in practical materia medica, which is often very limited, they would accomplish a great deal for pharmacy in the way of combating the evils which they are suffering from.

Mr. Canning.—I think the remarks made by Mr. Redsecker have borne out the suggestions of the committee here, the members of which thought exactly as he has expressed himself this evening. We believe this work can be done better by individuals. We will all admit that every pharmacist in the country has a certain immediate circle of physicians who come to him daily for advice. There is no doubt of that. But when you go into a convention of physicians, and suggest that they do away with the prescribing of certain goods that are somewhat detrimental to our interests, it seems to me it is rather a different way of putting it. The proprietary-medicine-man appears the next week among the physicians with samples, and says, "That's all balderdash that you have heard at your meeting." We know just what these goods are, and can explain what they are, and I only wish all pharmacists would do as Mr. Redsecker does, for then we would soon be rid of the evil. That is the way we do it in Boston, and I find results equally as good as those stated by Mr. Redsecker. The committee think that better effects would be accomplished in the end by this plan of individual work, as there would then be more than you would otherwise reach, and in a better way. Strike nearest home to reach the physician, and by individual work more will be gained than could possibly be achieved by appealing to conventions. In Massachusetts we have frequently thought of a great many matters that we would like to confer upon with the medical profession. We have brought them up, and two or three times have sent communications to the State Medical Association on the subject, but these have been invariably laid on the table. Now, we must profit by our experiences in this world, and experience has taught us this—we know what we can accomplish as individuals, and what many individuals may accomplish; and that work may not only be done more thoroughly in that way, but we think done much better.

MR. ALEXANDER.—While I think it is a very good thing to fight the fire as Mr. Redsecker is doing, by his own preparations, at the same time it seems to me that by that method the number of proprietary medicines is multiplied. Does he give his formulas to his neighbors, so that when a physician prescribes his preparations they can be put up at any store in Philadelphia? It seems to me we are all trying to avoid as much as possible increasing the great number of these proprietary remedies. I have no objection in the world to these men making their own preparations, but let them publish the formulas, so that they do not become secret remedies.

MR. MANNING.—The remarks of the gentlemen who preceded me cover the field as to the druggists of our city, I think. We agreed among ourselves to adopt the National Formulary as the basis upon which we would prepare our elixirs and other goods, and then advised the physicians of the city that we proposed to carry a complete stock of all these preparations, and whenever they intended to use a proprietary article like Bromidia, if they would substitute the corresponding preparation of the National Formulary they would find it in any of the stores in the town. We circulated samples of the preparations, and it has worked very nicely, and in our locality the National Formulary has become very popular. We left with each physician a copy of that work, and from our experience in the small field in which we have worked, we think if the physicians were made more familiar with the preparations of the National Formulary, and the druggists would meet on the same plane, and make those preparations, not classing them as their own, but as the Formulary's known by us all, the objection to carrying a large stock of A. B. & C.'s preparations would be overcome.

MR. REDSECKER.—I should have stated that we use the Formulary of the American Pharmaceutical Association, though not as to Bromadine perhaps; but one of our local members telephoned one day, inquiring whether we had Bromadine, and I told him we had. He inquired what it was, and I told him it was a formula similar to the Bromidia, and gave him the formula. He asked whether he could give that, and I told him he could. I have given the formula for Lister's Antiseptic Solution, as I call it, to a number of members of the Pennsylvania Pharmaceutical Association. In preparing this, at first, I went on the basis of the published formula, and made something I thought was very much like it. Afterwards I got from a friend a similar formula published in the Druggists' Circular, but I thought mine was a little better than that, and I continued to use it, and will be pleased to give it to any one. I did not publish it in the papers, because I did not think anybody would care particularly about having it.

Mr. James.—What I wish to emphasize is this: there is not among the practicing physicians that antipathy to learning that most druggists seem to think there is. The great trouble is that these things have not been properly brought before them. In my experience as a practicing physician, and also as an editor of a drug journal, I come in contact with a great many physicians who have not heard of the National Formulary. They are busy practitioners who do a great deal of business, and it has never been brought to their attention. The only effort in that direction, I believe, has been made by Professor Hallberg of Chicago; he is the only one who has made any practical endeavor to get them acquainted with the National Formulary. The mode of attack should be through the National Formulary to the physician, and if there is any way of getting it into their hands, this question would soon be settled, because as far as my judgment is concerned—and I have practiced some twenty-five years—there is absolutely no antipathy on their part 'to learning from the druggists or anybody else. I am satisfied the great body of physicians would be only too glad to be made aware of these things, and if the Association can find a way to do that, it will solve the problem.

Mr. McIntyre.—A thought which has not been expressed yet is this: While we have a Pharmacopœia and a National Formulary, and have all been taught materia medica, pharmacy and chemistry, very few of us have been taught therapeutics. Therefore, instead of having a series of literature prepared as short notices for commercial purposes, it would be in better taste to divide the matter—so that we will continue to prepare the medicines, but that the labels and pamphlets necessary to introduce these medicines be gotten up under the authority of the American Medical Association. I do not feel quite competent to endorse the supposed virtues claimed for a number of the preparations by the interested writers of the literature referred to, and I think we should ask the assistance of the American Medical Association in having this matter rewritten, because it seems to me that in many sections of the country the practice of medicine—at least so far as many new remedies are concerned—must be more learned from this species of literature than from medical colleges and text-books. Let us try to get rid of this thing, and if possible get the American Medical Association to appoint a man to undertake to supply a complete record of reliable observations on medical subjects, like Mr. Diehl prepares the Report on the Progress of Pharmacy.

Mr. Seabury.—I have advocated for years that the American Pharmaceutical Association should ask each State Pharmaceutical Association to meet with the State Medical Association, and direct attention to this National Formulary. That is a more practical way to familiarize it among physicians than any other which has been suggested. If there be a county organization, let a committee be appointed in the county or local organization, thus placing the whole matter on a plain and practical system of organization. That, I think, is the best plan that we can enter into for the speedy and general dissemination of our desires. We should unite to-day to do good for ourselves in a commercial way, and if we won't do it in a commercial way, we won't in a scientific way. As I have said on many occasions, it is a great mistake to think that the American Medical Association will snub every pharmacist that appears before them. When we assert our professional attitude we will commence to settle upon that plane where we ought to have been years ago.

Mr. Nattans.—I move the adoption of the first recommendation of the Committee.

The motion was seconded and adopted.

The Secretary read the second recommendation contained in the Committee's report, and Mr. Nattans moved the adoption of the recommendation.

MR. SEABURY.—We spent a great deal of time this afternoon on the question of how to put a stop to cutting. We have a gentleman here to-night who has been engaged in that work in a neighboring country—Mr. Clark, of Ontario, Canada, President of the College in that Province, who is a delegate here.

MR. CLARK.—I was very much interested in the remarks that were made by Mr. Hallberg and one or two other gentlemen to-day. There was a good deal of practical information given to the Section by these gentlemen. I also approve strongly of the remarks made by Mr. Ebert. As far back as 1884 we were confronted by the same question which has sprung up in the United States; that is, some men tried to take advantage of their neighbors, by inducing custom to come to their places of business by offering lower prices than is customary in trade. One started to sell goods without profit—that is, the profit on the goods obtained by the sale was not sufficient to pay the expenses of the store. That evil confronted us in our city, and we didn't know what to do until a suggestion was made, which I think was approved of very generally. One pharmacist would say, "I have been here ten years in business in the city, and I know men in the trade who have passed one another without recognition on the street." Another said "We are all in the same calling, and what helps me helps my neighbor." And so the feeling continued until the result was a local organization. We organized, and we did it in such a way that it would stick. We prepared a constitution and by-laws, which took in every man except the one who wanted to take advantage of his neighbor, and in six months he was glad to come before the association, and agreed to live up to its requirements. We meet once a month, and have a regular form of business. We do not forget the social side. We meet in general session once a year. We do our utmost to foster a spirit of harmony among neighbors in trade, and with very great success. In an association where members are suspicious of each other no good can be accomplished. You cannot do this in an organization of twenty or thirty thousand druggists, but you can do it in small organizations, where interests are identical. Local interests differ, and each requires its special treatment. At our meetings we discuss all questions in relation to trade. We do not go into scientific subjects, although there is a Section for that. If anybody wishes to read a paper he can do so. We have more of the commercial and social elements presented.

On one occasion a manufacturer of proprietary goods cut rates, and distributed his goods among our department stores, which demoralized business. On being requested by the Association to put a stop to it, and prevent his goods from getting into the hands of rate-cutters, he intimated that he would run his business to suit himself. Thereupon he started sending out circulars broadcast, offering these exceedingly low rates to grocers and general store-keepers. Unanimous action was taken; the druggists stopped buying his goods, and with the result that there was not a bottle to be had in our section, and when customers inquired for his preparation, they were told that none of it was to be had. At the end of a year the manufacturer found he had dropped one-third of his trade, and he was very glad to come to terms, agreeing not to let the wholesale grocer handle his goods, and arranging prices satisfactorily. That was four years ago, and since then there has not been a bottle handled by the grocers at all; the business has all gone back to the druggists, and we are satisfied.

The question has been asked, what can you do in the large cities, where there are two or three hundred druggists? You cannot get them to work in one body and all united in one organization. A suggestion has been made, however, that is a good one, which is to organize them by wards, or in any other division in which you can get them to come together eventually. Get confidence among the trade, and when they enter into any arrangement let them carry it out as well as they can, and until you do that, whatever the manufacturers or jobbers do will be successful. You cannot expect manufacturers or jobbers to do the work of the retailer to help him out, and it is only by coming together as we have done that you can gain success. We found the only way to do it was by our small local organizations, and when a question came up, as it did a year ago, when an organization smaller than ours required assistance, we came forward and helped them, and the matter was disposed of very quickly. We didn't allow it to develop, but settled it without delay. Now, there are certainly in the occupation of the pharmacist two sides, the professional and the commercial. Those two sides are closely connected, and yet we say it is the professional that we should aim to elevate. I venture to say that if you confined the occupation of the pharmacist to the purely professional side of the business, three-fourths of the drug stores in this country would have to close up. You have to depend on trade to pay your expenses. I am now speaking of our experience.

There is another point I wish to mention. We never knew our strength until we organized. We could not get the Legislature to enact the law that our pharmacists required. Why? Because only a committee went before it, composed of individuals. We now have several strong organizations, who sent delegates to the Legislature, and they said, "Are you going to support this or not? This is a personal matter. If you cannot support it, will you not oppose it?" They argued and explained what was wanted exactly. We found that it took nine years to get an amendment which was passed in 1881, and only six months in 1889 to secure a similar result, on the strength of our local organizations, which were perfected in that interval. We only wanted what was just and right, and we got it. You will be able to do the same in every State, if you adopt the same plan which has answered with us so successfully.

Mr. Canning.—I would like to inquire how this plan would work in a city like Boston, where I come from, where this cutting has been entirely outside of the drug trade, by large establishments selling all classes of goods, and merely using the patent medicines as a means of drawing customers to their stores. What good would a local organization of that kind do, even supposing every druggist in Boston were to enter it, as determined to maintain it as the druggists of Mr. Clark's city, when those parties can get the goods (not from the manufacturer individually, because there are many manufacturers who will not sell to those houses direct) through one source or another, and if not from a jobber in their own city, they will go to the end of the land to get them, and get them they will. How, unless we have something that will combine all three interests, the manufacturer, jobber, and retailer, is that remedy going to be reached?

Mr. Clark.—I think I can explain that entirely to your satisfaction. You mention stores, by which I suppose you mean "Fairs," etc. There is a certain class of articles that we sell as pharmacists that are really trade goods, such as sponges, chamois, hair brushes, etc. You cannot get one cent more for them than your neighbor will get, and the sooner you make up your minds to that the better. But there is a certain class we can control, and that is those articles essentially for physicians' use—medicines of every kind, including patent medicines; for those which are not handled by the retail pharmacist do not get such a hold on the public as they would if distributed in that way. Again, if you find that a man gets hold of somebody's preparations, and it is a leader in the market, you say, "If you intend to allow this man to get your goods at such a price that he can sell a single bottle for the same as we pay, we will get somebody else's goods, and let yours alone." He has to choose, and if he puts his medicine into the hands of the dry-goods man or anybody else, it is sure to drop very quickly. You can do that when you go to the manufacturer and jobber and say, "We are determined to pursue a certain course. We are united. We give you our word of honor, there is no forfeit in it." We had to take their word for the first two or three years. When you come and face a man with twenty or thirty of his breaches of contract, he doesn't do it again as a rule.

Now, you have to take the interest of the jobber along with that of the retailer and manufacturer. Your interests are identical. For instance, a jobber goes to a man and says, "Sell me twenty gross of your article. What is your price?" The retailer has to buy a half dozen or a dozen articles; there are so many that he requires, and if he bought more he would have no money to pay for them. The jobber should certainly have a profit on the goods that he handles, for he has to run the risk of collecting the money from the retailer; he has to get all his money back, and has to cover his losses. We must not forget that the jobber is essential to this country, and will be for some time to come. If the retailer were compelled to go to the manufacturer for his goods, I venture to say that he would not be as well pleased in his dealings. You cannot ask the manufacturer or jobber to do work that you have to do yourself, but if you say to them, "If you pursue a certain course, you are working against the interests of us as a combined body." You must discriminate. You cannot say to a man, "You cannot do so and so;" but he cannot afford to ignore one-half of his customers for a little matter, and he will heartily join with you and help you. You will find people get small lots, as in our case; but you hunt them up, and find where they obtained them—perhaps by misrepresentation. Then say to the manufacturer, "Do not let this occur again, or you will lose our trade," and he knows where his interest lies, and will act accordingly.

Mr. Nattans' motion to adopt the second recommendation of the committee was then agreed to, and the third recommendation was read, and, on motion, of Mr. Redsecker adopted.

On motion of Mr. Seabury, duly seconded, the report was adopted as a whole.

Mr. Eliel.—With the close of this business, the duties of the officers of the Section for the past year come to a close, and I desire to thank you for your kindness and indulgence towards me as your Chairman. I now take pleasure in introducing to you Mr. Canning, of Boston, who has been elected as Chairman of this Section for the ensuing year.

Mr. Canning.—I have to thank you for the honor conferred in this election, and while I do so would add a few words to what I have already said.

It seems absurd that a body of intelligent men should stand up here and speak of the cutting of prices of patent medicines. Why do we do it? Not because we love the patent medicine man, but because we believe that goods should be sold through only one channel—because we know that one by one the little articles that were formerly controlled by the druggists are dropping away, and it is because we do not know where it is going to end that we are trying to cry a halt, and have been agitating this question for so many years. After all, agitation is what brings about great reforms. We begin on agitation, and I suppose we will get there some way in the end. Some good has come of it in certain localities. We have not succeeded in the larger cities, but I hope, and it will be my earnest endeavor during the coming year to see if we cannot bring about some feasible plan; and I reiterate once more, that we shall never bring about anything in any shape or manner, and our talk will be simply wasted, until we have united action of all three interests; for the interests of the three are the interests of each—the jobber, the manufacturer, and the retailer.

Now, one heroic plan has been suggested, and it has been practiced by all of us for years. We all manufacture our own preparations, and whether you manufacture them as individuals or as a syndicate, the result is the same; but there is that large business going out from us that we want in our pockets. When we manufacture those goods, what are we obliged to do? We are required to manufacture them simply to sell them at a profit on cutters' prices. That in itself hardly seems to be the thing for intelligent men to do, but there are a great many things that we have got to do for the sake of the pocket, and that is one of them. I thank you, gentlemen, for your attention.

MR. REDSECKER.—Before we adjourn I wish to move that a vote of thanks be tendered to the retiring Chairman for the very efficient and courteous manner in which be has presided over the meetings of this Section.

Mr. Nattans seconded the motion, which was carried unanimously.

MR. ELIEL.—I would make a suggestion, that each member present act as a committee of one in his State Association to secure its co-operation with the Section on Commercial Interests of this Association. By combining the trade interests of the various associations this National Association will be able to accomplish a few of the many objects, for the purpose of which this Section was established.

MR. CANNING.—I would add to the words "State Associations," all local associations which are in existence throughout the country.

MR. EBERT.—I rise for a personal explanation in relation to the remarks of Mr. Finlay, made in regard to the views expressed by Dr. James and myself. I think Mr. Finlay misunderstood the idea we wished to convey, which was done rather obscurely perhaps, but the intention was to urge upon the State Pharmaceutical Associations to deal more especially with trade interests; to present their views on these subjects to this Section of the American Pharmaceutical Association, and to devote less time to scientific matters at their meetings. They should look closer to matters of business, and when these deliberations have reached a result to be put into effect, so as to be beneficial to the profession or trade at large, they should send it to this Section at its annual meeting, so that we may discuss it. That is my idea. I want to correct the impression which Mr. Finlay's remarks have conveyed, that we are opposed to scientific discussion in the State Pharmaceutical Associations. Scientific matters I want to have brought to the American Pharmaceutical Association for discussion by the Scientific Section; that is what I lay particular stress on; but trade matters should be discussed to a greater extent by the State Associations.

MR. SEABURY.—I would make a suggestion to the Chair, that the committee take into consideration the drafting of a circular requesting every local, county and state organization in the country to send to them any matters which would be in strict relationship to this Section. What we want is to interest every organization in the United States in the work of this Section, and we will thus be supplied with a number of interesting subjects for discussion at our next meeting. I would therefore ask Mr. Ebert to second a motion to that effect, that circulars be addressed to the different pharmaceutical organizations throughout the country, making the request I have suggested.

MR. MCINTYRE.—I was about to rise and ask if any of us were charged with collecting that kind of information, by communicating with the various State Pharmaceutical Associations.

Another point I desire to call your attention to. The Pennsylvania Association has sent a committee to the State Medical Society; it has a Committee on Trade Interests, and has appointed a delegate to the National Wholesale Druggists' Association, coupled with the provision that the Association will bear the expense of his trip. Might not this Association adopt this plan to insure a delegation charged with the responsibility of the work?

MR. SEABURY.—I would answer the gentleman that since the organization in this Association of sectional departments, when business properly belongs to this Section we do not propose to burden any other with it. If there is any expense, this Section must bear it.

Mr. Seabury's motion having been seconded by Mr. Ebert, was then put to a vote and unanimously carried.

The Section then adjourned.

After the adjournment of the Section, Mr. Canning made the following appointments:

Committee on Commercial Interests (in addition to the Chairman and Secretary elect).—S. A. D. Sheppard, Boston; G. W. Voss, Cleveland, and L. Myers Connor, Dallas, Texas.

Committee for Conference with National Wholesale Druggists' Association.—W. S. Thompson, J. A. Milburn, and D. M. R. Culbreth.

Committee on Mutual Insurance.—H. M. Whitney, L. Eliel, Louis Dohme, J. Ingalls, and D. L. Haigh.

MINUTES

OF THE

SECTION ON SCIENTIFIC PAPERS.

FIRST SESSION, WEDNESDAY MORNING, SEPTEMBER 10.

After the adjournment of the fifth general session of the Association, the Section on Scientific Papers was called to order by Chairman Whelpley. In the absence of the Secretary, A. B. Stevens was appointed Secretary *pro tempore.*

The following communication was read:

OLD POINT, VA., *September* 9, 1890.

MR. KARL SIMMON, *President American Pharmaceutical Association:*

Dear Sir:—I have the pleasure of announcing that Professor Joseph P. Remington will deliver a lecture on the Metric System before our Association to-morrow morning, September 10th, at 11 o'clock; and to communicate through you the following resolution:

Resolved, That the members of the American Pharmaceutical Association be invited to attend the session of this Association to-morrow morning at 11 o'clock, for the purpose of hearing Prof. Remington's lecture on the Metric System.

Very respectfully yours, C. B. FLEET,
Secretary Virginia Pharmaceutical Association.

On motion, the invitation was accepted, and the use of the hall was tendered for this purpose.

The Chair appointed Messrs. Henry C. C. Maisch and R. C. Hattenhauer a Committee to wait upon the Virginia Pharmaceutical Association and inform that body of the action of the Section.

The Chairman now read his Annual Address, as follows:

Fellow Members of the Scientific Section of the American Pharmaceutical Association:

GENTLEMEN:—By the precedent set at the last annual meeting of the Association, the Chairman of this Section is expected to read an address.

I can assure you that the officers of the Section have not been idle or neglectful of their duties for the past year. As fruits of our labor, we cannot show at present as great a number of papers as were read last year. In the first place, we miss the bountiful supply furnished by the California members when we met on the Pacific Coast. In the second place, the papers have been more carefully divided among the Sections, allotting each one to its appropriate place.

I commend to your careful attention the papers which are to be read, and urge you to fully discuss the points which they present. It is in this, the Scientific Section of our Association, that discussions, tempered with the liberal spirit of the pharmaceutical profession, can demonstrate facts and formulate principles based upon the sciences. The result of the labor and experience of one becomes the common property of all, and thus we are each placed under obligations to those who instruct us by their papers or discussions. I earnestly hope that not a single paper will be referred for publication without thorough discussion.

In accordance with the instruction of this Section last year, we have had all the papers printed which were received in time. Copies of them will be distributed before they are read. I find that those who write papers are anxious to have them printed before the meeting, and I believe they prepare better copy than would be prepared for ordinary reading. The reading and editing of these papers is no small task, and I trust that the officers for the next year will receive more type-written copy than has been received by us. That modern convenience, the type-writing machine, is now in such general use that there is but little excuse for furnishing a paper in hand-writing.

The attention of authors was called to the resolution requesting them to present synopses of their papers. The result has not been very satisfactory. Perhaps it will require a year or more to impress authors with the importance of furnishing such synopses.

Some contributors have failed to understand that an article becomes the property of this Association as soon as received by the Section, and that the author loses all privileges of publication elsewhere.

Another point in this connection is the presentation of papers which have been previously read and accepted by State Pharmaceutical Associations and other organizations. I am aware that the same subject may be discussed before more than one Association, but I believe that papers accepted by another Society should not come before us for discussion and publication in our Proceedings.

Last year my worthy predecessor in office recommended that a committee of three be appointed to submit a list of queries to the Chairman of the Section within thirty days after the adjournment of the Association. The recommendation was not adopted, but as a substitute the members of the Association were requested to each contribute a query. I have failed to see the benefit derived from this action, since only two or three members have responded.

In conclusion I desire to submit a few suggestions:

1. I believe it is advisable to follow the custom of the past few years, and again have the papers printed by the Association before the meeting.

2. It should be understood, without question, that when a paper is accepted by the Chairman of this Section it becomes the property of the Association. As soon as a paper has been read and referred for publication in the Proceedings, pharmaceutical journals and other publications have the privilege of obtaining copies from the stenographer or author and publishing the same, provided they give proper credit to the American Pharmaceutical Association. No author shall have the right to reserve control of such publication and restrict it to one or more journals, and all articles submitted to this Section must be prepared especially for the American Pharmaceutical Association.

3. Authors of papers should be requested to furnish type-written copies of their contributions whenever practicable.

4. The special attention of members should be called to Chapter VII., Article IV., of the By-Laws, and contributors are urged to prepare synopses of their papers, or come prepared to give the main points verbally.

5. I suggest that a committee be appointed early in this session, and each year hereafter at the opening session of the Section; the duty of this committee to be solicitation

of queries from the members present at the Convention, and reporting the same to the Chairman of the Scientific Section within at least thirty days after the adjournment of the Association.

On motion of Mr. Remington, the address was referred to a Committee of three for consideration and report; the Chair appointed Messrs. Remington, Wooldridge and Sheppard, such committee.

Nominations for officers of the Section being next in order, Mr. Remington nominated Mr. E. L. Patch, of Boston, for Chairman, and Mr. Behrens nominated Mr. C. S. Hallberg, of Chicago, as Secretary. No further nominations being made, they were laid over for action at a subsequent session.

Mr. Eckford read the following paper:

A REVIEW OF THE VARIOUS METHODS OF PERCOLATION.

BY J. W. ECKFORD.

When this topic was selected for a brief paper to present to the Association, I had only a vague idea of the vast volume of literature that was in existence on this subject, and after much thought, and close inquiry into the matter, I fear I cannot produce a single point that has not been time and again discussed and completely exhausted.

My indifferent experience would suggest that I be very careful in reviewing a theme that the brightest minds in our Association have spent a "lifetime of labor" in trying to perfect and to enlighten us upon.

Many of our most intelligent and experienced pharmacists and manufacturers have invented or adapted apparatus for percolation, for which they claim perfection, and they produce all kinds of arguments to convince their hearers that their opinions and convictions are correct.

Mr. S. J. Hinsdale describes an apparatus for percolation of fluid extracts, tinctures and syrups, which to my mind has a good deal of merit. The chamber for the reception of the substance for percolation is provided near its lower extremity with a strainer and stop-cock. The upper part of this chamber is attachable to an air chamber above it, the connection being made air-tight by means of screw thread and rubber gaskets. A convex diaphragm with marginal openings is located in the air chamber near its connection with the cylinder below. Attached by a flexible pipe to the air chamber is a bulb of rubber provided with valves, by the aid of which the tension of the air in the chamber can be increased, and the operation of percolation hastened. The theory is very plausible, and may be practically a success. I have never seen it tested, but imagine it would have staunch advocates. It certainly seems to suggest economy of time and material.

The improved "Rosenwasser" that has been so critically discussed and by some severely judged, seems to have been adopted by many experienced pharmacists; it is much simplified, is practical, and by those who use it and like it much is said in its favor, giving valuable service in rapid filtration and economy of material. This percolator has been subjected to a lengthy and very able criticism by Dr. Cummings, of Portland, Maine. It will amply repay every pharmacist to carefully study this article, published in 1884, entitled "A Study of Percolation." It seems to serve the double purposes of percolator and tincture-press, and in my opinion deserves a place in the laboratory of every progressive pharmacist.

The principle of percolation is so simple and philosophical, and the solubilities and exhaustibilities of all crude substances in our materia medica have been so frequently traversed, I can really see no wisdom in a further discussion or review of the subject, unless perchance some genius can come to the front with an entirely new theory, and thoroughly demonstrate its utility.

There being such a wide difference of opinion as to the various methods of percolation and their respective advantages, the inquirer, after securing the views and experience of the ablest thinkers on the subject, is finally compelled to await the result of his own researches and experiments. The manufacturers of fluid extracts and tinctures, for the jobbing trade require altogether more complicated and extensive apparatus than the average retail pharmacist, hence the experience of the one differs materially from that of the other. The Pharmacopœia was made principally in the interest of the retail pharmacists, and as they are largely in the majority, and as they are in the habit of dealing with small quantities, and the loss of material incident to percolation of small quantities is insignificant, they as a class do not regard the sustained loss as of much moment, and do not fully appreciate the importance of the economy of time and material as the wholesale manufacturer does; yet the retailer is wrong, if he is indifferent as to these little savings, which amount to considerable in the period of a twelve-month. The more economical plan is for him to purchase his fluid extracts and tinctures from some reliable manufacturer.

An apparatus described by Mr. W. M. Thompson, of Philadelphia, which consists of three separate and distinct parts, differing from most others in its operation, has much to commend it. The upper chamber constitutes the reservoir for the menstruum and compressed air, acting in the double capacity of vacuum and compressing chamber; receives the menstruum by creating a vacuum therein, subjecting the menstruum immediately thereafter to a pressure of three or four atmospheres, and retaining the same under compression until required. The great advantage claimed by this method is the full and constant effect of the compressed air upon a column of menstruum, forcing it through the drug mass, the construction of the apparatus allowing a body of liquid to be constantly between the drug and the air. Another peculiar feature in the construction of the apparatus which commends it is the fact that it can be reversed without changing it; should in any case the percolate fail in being saturated, then the reservoir becomes the receiver, and *vice versa*—the same method of procedure forcing the percolate upwards through the drug again, which can, if so desired, be returned.

My own experience is that the simpler the apparatus, the more available it is; and I think this is the opinion of the average retail pharmacist who manufactures for his own retail trade. The main object is practical exhaustion, etc. We find no difficulty in accomplishing it with the ordinary cylindrical (slightly conical) percolator, when the drug is in the proper degree of fineness and carefully and intelligently packed—which is of the highest degree of importance. We usually allow the drug to macerate in the first portion of the menstruum for some time before it is allowed to flow. It would appear that those percolators which require the menstruum to flow through a tube in order to get a greater pressure, are not desirable for our drugs, notably ipecac, etc. When the menstruum becomes laden with the soluble portion of the drug, its natural gravity is sufficient to induce as rapid percolation as is expedient. While it might appear that the drug would swell from absorption and become too compact, it seems that the abstracted principle counteracts this condition. Repercolation is sometimes necessary, though it is not usually practiced when the drug has been properly packed, and allowed to macerate long enough. When it is not rightly packed and is allowed to percolate at once, the menstruum is liable to flow around and not through the drug; but when well done, the first portion not being able to pass around is absorbed by the drug, from which it extracts the active principles and becomes heavier, and is displaced by the succeeding portion; and when properly conducted each succeeding portion should be less impregnated, until the last should be devoid of taste and smell of the drug—evidence of exhaustion, every portion of the drug having been permeated with the menstruum.

The experience of J. W. Colcord is that preliminary maceration is objectionable; and he endeavors to show that better results are obtained if about one-eighth of the desired amount of percolate is collected, and then maceration and percolation alternately proceeded with. Some writer says that all percolation should be practically a succession of macerations. A maceration implies time, but the question is, If a current passes a cell wall, picks up a portion of its soluble contents, and passes on without pause—can that be called maceration? This inquiry is food for thought. Percolation keeps the menstruum in motion; maceration keeps it stagnant and quiescent.

As we cannot agree as to the best method, let us store our minds with the experience of the very best authors on the subject, and govern ourselves accordingly, adopting the best, and rest content, for—

> "Like doctors thus when much dispute is past,
> We find our tenets just the same at last."

> "Who shall decide when doctors disagree,
> And soundest casuists doubt, like you or me?"

Aberdeen, Miss.

Mr. Connor.—I take exception to the use of the word "syrup" in the paper as a percolate. I consider that the effecting of a complete solution does not make a percolate. The term as used in that connection is a misnomer.

Mr. Shinn.—I am compelled to criticize the statement that it is more economical to purchase the tinctures and fluid extracts from the manufacturers; even if the pharmacist makes only a small quantity of the product, he will find that he can save at least 50 per cent., besides producing a better article, and knowing exactly what he dispenses.

Mr. Markoe.—The point made by Mr. Shinn is that he gets the inestimable satisfaction of knowing exactly what he dispenses. I think I am perfectly safe in saying also, that as a general rule the pharmacist can get for his small needs two or three pounds of a more select drug to use than the large manufacturer can often get. Those who work on a large scale know that it is sometimes impossible to get a high grade of materials necessary to supply a very large trade. Of course, there are some cases in which the large manufacturer has the advantage; but I desire to emphasize this remark, taking it in its broadest sense, that there is no reason why the pharmacist should not make his tinctures and fluid extracts. As a practical man, I think that all these complicated percolators are a bugbear, a delusion and a snare. Special percolators are all very well for special cases, but those which have been described, with joints and pressure chambers are a mistake, and have the tendency to drive the pharmacist into the hands of the manufacturer, which is a bad plan. The pharmacist, with proper care, and with no more elaborate apparatus than the ordinary percolator or a funnel, can get better results, and such as are fully up to the standard contemplated by the Pharmacopœia. I do not mean to say that these gentlemen, who have spent so much time in devising an apparatus, have not done some good things—and for certain special purposes they are excellent—but to say that we have to use only such an apparatus to make ordinary fluid extracts is erroneous.

Mr. Lloyd.—There is one point I think the author of the paper is mistaken in. He states that the manufacturer of fluid extracts and tinctures for the jobbing trade requires altogether a more complicated and expensive apparatus than the average retail pharmacist needs. But I believe that simple percolation is the method adopted by manufacturers universally, the ordinary percolator being used, and when they need quantities of 100 or 2000 pounds, it is the only practical method.

Mr. Sheppard.—In regard to this question of pressure being designed to hasten the operation, it should be borne in mind that by doing so, whatever you gain in time you lose in strength. If the liquid is caused to pass rapidly through the mass to be percolated, it will not have time to properly extract the principles of the drug. Therefore when you are forcing the menstruum through you will find a good deal of active matter retained in the mass. The slower way is the best.

Mr. Markoe.—I agree with that. Most experienced operators will admit on consideration that the extraction of the drug is really a process of dialysis, that the vegetable cell is really a dialyzer, the cell wall being a septum, and you have to give time for the menstruum to penetrate it, to dissolve the principles. When this process has taken place, you have the presence of a more or less saturated solution in the cell, which must be pushed out by new menstruum. On the contrary, if you do not give time, you simply exhaust the outer portion, and do not reach the inner portion of the cell. I recollect a case in point, where I had an argument with a manufacturer who was making fluid extract in this way, and to prove that I was right I took the mass left, worked it over again, and made a very good extract.

At this point the committee appointed to visit the Virginia Pharmaceutical Association reported that the invitation presented to that Association had been accepted, and its members would be present to hear the lecture of Professor Remington, in company with the American Pharmaceutical Association.

The following paper was presented:

FLUID EXTRACT OF IPECAC.

BY T. J. MILNER, PH. C.

The method for the manufacture of fluid extract of ipecac has met with criticism on every side, and the object of the investigations here recorded is to ascertain the best method for the manufacture of an extract that shall contain the largest proportion of the active principle.

The pharmacopœial method has been objected to, both on account of the personal care and attention required, and also on account of the strength of the resulting product. Two methods have been suggested as improvements on this, one of which was given by Rother (Drug. Circ., 1884, p. 4); and the other by Robbins (Am. Jour. Ph., 1883, vol. 55, p. 128). Both these methods and that of the United States Pharmacopœia were used in these experiments upon the same sample of drug, and each extract obtained, as well as the original drug, was subjected to assay.

The method of assay used for the estimation of the emetine was that of Dragendorff as modified by Dr. A. B. Lyons (Am. Jour. Ph., 1885, vol. 57), in which no allowance is made for the volatile alkaloid discovered by E. M. Arndt (Am. Jour. Ph., 1889, vol. 61, p. 78).

Two assays were made of each extract, and four of the drug, the average per cent. being given in each case. The extract made according to the United States Pharmacopœia contained 46 per cent. of alkaloid.

The method given by Rother may be stated as follows: Triturate an ounce of calcined magnesia with two fluidounces of alcohol, and to the triturate gradually add 16 ounces of powdered ipecac. When thoroughly mixed divide into two equal portions, one of which is loosely packed in a percolator and a disk of two filter papers placed upon it, so as to entirely cover the powder. The other portion of the powder is then placed upon this, and packed quite firmly. Alcohol is then added until the powder is saturated and the liquid begins to drop from the percolator. The lower orifice is then closed, and the top of the percolator closely covered, and the contents allowed to macerate for twelve hours.

The extract made by this method is clear, of a ruby-red color, and is entirely free from precipitate. Upon assay it was found to contain 45 per cent. of the active principle, or a little less than that obtained from the United States Pharmacopœia extract.

Robbins' extract, which is made by the usual method with a menstruum consisting of three parts of alcohol to one of water, does not give nearly so perfect a solution as that of Rother. After standing a few hours, a copious precipitate forms, settling to the bottom. This, he says, should be removed by filtration, leaving the extract perfectly clear, and which, he affirms, will remain so without further precipitation on standing. But the extract prepared by myself, still contains a precipitate after three times filtering. This preparation, in the hands of the writer, yields 75 per cent. of the alkaloid contained in the drug.

An extract was then made with a menstruum, consisting of four parts of alcohol to one of water (in the same way), and macerating for three days. This gave a finished product, with scarcely a trace of precipitate, and showed the presence of 85 per cent. of the total alkaloid.

A fluid extract was then made, using the same menstruum, and allowing the same length of time for maceration as the preceding, but mixed with calcined magnesia and packed in the percolator, according to the directions given by Rother. This fluid extract contained 80 per cent. of the total alkaloid. As a solution it was little or no better than the one preceding.

Another extract was made, using alcohol and water in the proportion of four to one, and adding one cubic centimeter of dilute sulphuric acid for each 100 grs. of drug used. This extract contained 75 per cent. of total alkaloid.

Two other extracts were made; one containing alcohol and water in the proportion of six to one; the other with nine parts alcohol to one of water. The former contained 71 per cent. and the latter 67 per cent. of the total alkaloid.

The preceding experiments seem to indicate that too strong an alcoholic menstruum is as unfavorable for the extraction of the emetine as one that is too weak, and tend to prove that the most favorable menstruum is one made in the proportion of four parts of alcohol to one of water, or nearly that.

Several samples of powdered ipecac were assayed, some of which were very poor. The one selected for the above experiments was unusually rich in emetine, containing 3.12 per cent. of that alkaloid.

Owing to the great variations in the strength of powdered ipecac, as well as in the fluid extracts, it has been suggested that the fluid extract of ipecac should be standardized. This idea is surely a good one, and if properly carried out, would be productive of good results.

University of Michigan.

MR. EBERT.—I did not speak on the subject of percolation, because we have frequently talked about it, and I do not think that we have in any way solved the problem, as the writer of the first paper has stated. Mr. Milner's paper, however, shows conclusively where we are at fault in the class of preparations called fluid extracts. There is no use in disguising the fact that the process of percolation, which although not of American origin, but adopted by us, and thought to be the great success of American pharmacy, is, as Mr. Markoe alluding to the pressure percolator says, a delusion and a snare. Percolation is a snare when you are to exhaust say sixteen ounces of the drug, and keep the soluble matter in solution in fifteen ounces of menstruum. The amount of menstruum suggested by the Pharmacopœia for the manufacture of fluid extracts, in nearly every instance, has not been sufficient to exhaust the virtues of the drug, and the result has been, you have always had left in the dregs a very large amount of the activity itself. The proper thing would be to do away with the class of fluid extracts; at any rate they ought not to be made by the process of percolation, as now directed. While a few of the drugs, I admit, may be so exhausted, there are a great number of them that cannot thus be exhausted. I think every gentleman who has handled fluid extracts will bear me out in the statement that those made by the manufacturing pharmacists of this country, after having been on the shelves for some time, change, and that the solvent, whatever it may have been, does not continuously hold the active principle in solution. There is the snare of percolation, although it is a very nice process. I have learned percolation in a very expensive school, having percolated over a million gallons; and I have come to the conclusion that percolation is not what it is represented to be. I believe in maceration. I have come back to the old tea-pot method of maceration—not for making fluid extracts, I confess. Now, what we want to do is to get rid of a class of preparations that are of no particular value except to start up manufacturers all over the world, just to make for you and myself, fluid extracts which are no better than those we can make ourselves, and do not represent the activity of the crude drug when they are prepared. The right thing, and I hope to impress the idea on the Committee on Revision of the Pharmacopœia, is to have a class of preparations that would represent half the strength of the drug, and such would very likely furnish the medical profession with preparations equally as good as those of the present time. It may be that the menstruum will require a lifetime's study before its alcoholic strength or proper composition can be determined for exhausting the drug and for keeping the dissolved principles unaltered in solution. I am in favor of reducing the present strength of fluid extracts, and of making them so that the retail pharmacist throughout the country can furnish them more reliable in character, and more nearly representing the active principle of the drug.

Dr. Eccles.—The remarks made by Mr. Ebert in regard to the exhaustion of the drug of all its active principles are of no value from a physician's standpoint. Physicians today do not use the crude drug. They know very little of the activity of the crude drugs, because they have been accustomed to using the present fluid extracts and tinctures. Uniformity is what the physician wants, and it makes no difference whether it is 50 per cent., or 5 per cent., or any other per cent., as long as it is once established, and he knows what it is, and what results he can get from it. As it is, he doesn't want to change. He wants the thing that he is accustomed to, and he wants it kept up. To change our fluid extracts to a 50 per cent. tincture has many objections that could not be entered into here, as it would take too long a time—objections of a therapeutic character. With regard to quality, any other article distinguished from the old fluid extract would require a change in the therapeutics of all the physicians in the United States—a thing they would not for a moment tolerate.

Mr. Sheppard.—I desire to put myself on record as being entirely in accord with Mr. Ebert on this subject. I hope this Association will take some action on that point, because I believe it is a condition of things that is bound to come about in the future, just as the Metric System is bound to govern the world over. I think we shall, in the future, see the fluid extracts and the tinctures as they exist to-day very largely done away with; and the very condition that Dr. Eccles speaks of as desirable, namely, that of uniformity, can only be brought about by some such arrangement as Mr. Ebert has described, that is, a menstruum that will hold all the active principles in solution. If there is any class of preparations in the drug-stores to-day that differ in strength, and on which I think the physician cannot depend, it is the fluid extracts as they are found in the United States, not only as made by different wholesale manufacturers, but as prepared by the druggist himself, and according to the age of the preparation.

MR. PATCH.—My experience with the United States formulas has not been arrived at by the paper. In the first place, if the ipecac is thoroughly exhausted by the alcoholic menstruum, and the fluid extract is freed from resin, it does not precipitate, and does very well represent the drug itself. I have an instance in mind where the crude drug yielded two per cent., and the fluid extract one and two-tenths per cent. I think that if the spirit of the Pharmacopœia is followed in the exhaustion with the alcoholic menstruum, and in thorough washing with water, no fault will be found with the Pharmacopœial method.

MR. LLOYD.—My experience has been the same as that of Mr. Patch in this matter. The spirit of the Pharmacopœia requires thorough exhaustion. Of course the amount of menstruum there given is hardly sufficent under ordinary circumstances, but we are certainly at liberty to carry the percolation to the necessary point. I wish to speak of a little method I resorted to in hastening the precipitation of the resin, which I think is admissible. If the resin is thoroughly precipitated by water at the ordinary temperature in the summer time, and the preparation, when finished, mixed with syrup in proper proportion, on standing there will be an additional precipitate. Now, instead of using a large amount of water, I take cracked ice and mix it with the resinous solution. The low temperature seems to separate the resin perfectly, and if it is filtered while cold the preparation remains clear indefinitely. I think this procedure will be recommended by all who have tried it.

MR. HALLBERG.—My experience with the present form of fluid extract of ipecac has been satisfactory. I never resorted to the use of ice, but I can readily understand that that would prevent this precipitation. Sometimes it will precipitate after being mixed with the syrup, but I have no doubt it can be effectually prevented by using ice to lower the temperature.

With reference to the formula, I never liked one of that character, and I do not think it is the kind of formula we should have in the Pharmacopœia to be called a fluid extract. It is more concentrated than there is any necessity for, and if there is any preparation beside the fluid extract of ipecac, which is almost exclusively used for pharmaceutical purposes, making syrups, etc., it certainly could be made of the strength suggested by Mr. Ebert, 50 per cent. It would expedite matters, give a better exhaustion, and would be better in every way. I would be glad to see that list extended. Dr. Eccles knows as well as I do, that physicians obtain just as good results from tincture of aconite as they do from the fluid extract of aconite, although one, on the face of it is twice as strong as the other. You might go through the list in the same manner. There is much complaint from the medical man on that point, and I hope the time is not far distant when the list of these preparations will be extended, which can be done without opposing the desire for not having too great a change in the strength.

DR. ECCLES.—It is a universal rule that that which is fit will live, and that which is best adapted will survive. Why do not these gentlemen who advocate 50 per cent. solutions or tinctures set to work and make them themselves, and try to sell them? Let the physicians grow into the habit of using them; then there will be no confusion, and as they become accustomed to them they will be introduced into the standard books, and used by the colleges; but to simply hurl them at the medical men of to-day is not right, because they will alter our system of therapeutics too much. As to uniformity, I insist on it for every article—not that all fluid extracts shall be just alike, but that the same tincture shall always be the same, and the same fluid extract the same.

DR. RICE.—Allusion has been made to the action of the Committee on Revision. There has been no action. The results of the labor of the Committee will be finally published, and until that time this point does not belong to this Section.

I would like to say something about 50 per cent. fluid extracts, as they have been called. Some people have ideas on the subject about as practical as it would be to insist that history shall be written before it is enacted. There are no such preparations at the present time. Let the medical profession demand them, and the pharmacist will readily concede the point; but for us to introduce, at this time, tinctures that have never been used, and cause them to be put on the market, would lead to immense confusion, and it would be dangerous for us to start on that plan. You may start it, if you wish to, and let the physicians test the preparations, put their results on record, and then refer the matter to the Revision Committee, which will meet in 1900.

MR. STEVENS.—I think the suggestion made by Mr. Patch is the only one that carries any weight, because none of the other speakers have proven that this preparation as made contains a certain amount of emetine. They simply state whether the method employed is satisfactory to them or not. Professor Patch states what he found, and that carries weight. The experiments detailed in this paper were made with the same root, and it was proved beyond a doubt that this preparation, made with four parts of alcohol to one of water, contains nearly double the amount of emetine that the solution made by the pharmacopœial method contains.

MR. HALLBERG.—What was the assay process employed?

MR. STEVENS.—Mayer's solution was used by the method modified by Lyons. I couldn't give the details now.

MR. HALLBERG.—I do not think any assay of emetine made by Mayer's solution is of any value.

MR. STEVENS.—That depends upon whether you make it volumetrically or gravimetrically. I want to call attention to several points. I understood Professor Patch to say that one sample which he examined was made from ipecac which contained two per cent. of alkaloid, and the yield of the extract was one and two-tenths per cent. In regard to the precipitation of the resin, we all know who have experimented on such work that you cannot precipitate the resin out of an extract without carrying with it a certain amount of alkaloid. We need cite only one instance—the resin in opium. If you precipitate the resin from opium by any means you may adopt, you will find you carry with it a very large percentage of the alkaloid, and I think you will find that will apply to almost every preparation.

MR. REMINGTON.—I did not expect to say anything on this subject, but there is a view to take of 50 per cent. fluid extracts, as they are called, which it seems to me is of very great importance. The history of fluid extracts shows that we have progressed in the direction of greater concentration. To now degrade them by calling them fluid extracts, while making them 50 per cent., would be to give the manufacturers of this country a leverage which would be enormous. It would be a confession of want of skill on the part of the pharmacist. The salesmen of the manufacturers, of course, would say, "Here's an admission that these men don't understand the process of percolation." We have no difficulty in making fluid extracts of full strength, but the Pharmacopœia makes them half strength. If there is a demand for 50 per cent. preparations, do not call them fluid extracts at all. Keep the extracts only for preparations which can be made easily of full strength, and keep any preparation of half strength out of the class of fluid extracts. The class of tinctures is large; we have 50 per cent. tinctures. If there is a demand for these preparations, put them in this class. I do not think we shall have any difficulty about this, but I do object, and hope the time will never come, when the fluid extracts will be 50 per cent. preparations.

MR. MARKOE.—A word in regard to the difficulty of a Committee like this adopting a class of preparations before they are adopted by physicians. I would refer to the class of abstracts introduced into the Pharmacopœia, which we thought were good preparations that physicians would at once adopt. I made a complete set ten years ago, to see how they would work, and I believe I have them all, except a few ounces of one or two of them. They were good preparations, without doubt, but the physicians didn't know anything about them. If we make fluid extracts of 50 per cent., we will have to teach the physicians throughout the country that they differ from the fluid extracts representing minim for grain, and I agree with Professor Remington that we have no right to apply the name fluid extract to a preparation that represents only 50 per cent. of the natural strength. If we have preparations of that kind, let us call them tinctures.

MR. EBERT.—There seems to be a good deal of misconception as to the use of the term "fluid extract." You can name such 50 per cent. preparations what you please. One argument is, "that the pharmacists of this country should prepare 50 per cent. preparations, and introduce them, even when the Pharmacopœia doesn't recognize them." That is asking us to do an impossible task. Do you mean to say that we shall go into the market, make and sell a new set of preparations, and get physicians to use them? That is impossible. Why did you increase, in the last revision of the Pharmacopœia, the strength of tincture of aconite root, making it 40 per cent., when it was formerly less? Have you had any difficulty as to the physicians prescribing it?

MR. REMINGTON.—There is no increase in its strength.

MR. EBERT.—It is now forty per cent., I understand. At any rate, the point is this: You should do away with a class of preparations. If the tinctures of the present strength are not strong enough, do away with them, and make the stronger class of preparations alike, 50 per cent.; they will supplant the fluid extracts, because the physicians will learn that they will get the same benefit from these preparations that they do from the present fluid extracts. I do not suggest abolishing the fluid extracts, but I say that the preparations in the market do not represent more than about 50 per cent., and we are compelled either to make them, or to go to the manufacturers and buy them.

MR. MARKOE.—The fluid extracts were introduced outside of the Pharmacopœia, and were in common use before the Pharmacopœia recognized a single one of them. The same applies to other preparations. The office of the Pharmacopœia is to give uniformity to things in use.

MR. BEDFORD.—Fifty per cent. fluid extracts are not new things. They were introduced by a prominent manufacturer about twenty years ago, to my certain knowledge, and a long list was introduced by Reed & Canrick, and, after having attempted to introduce them without success, they were withdrawn from the market. That is a little point on the commercial side of the question.

Mr. Heinitsh exhibited an original copy of the second edition of the first Pharmacopœia published in North America.

Mr. Heinitsh.—This Pharmacopœia I inherited with my father's library; it was bound in paper cover with rough-edged leaves. I had it rebound to preserve it, and the Preface translated by Prof. Wm. Nevin, of Franklin and Marshall College, Lancaster, Pa. Where it came from I don't know, but suppose it originally was in my grandfather's library, as in his day he supplied Lititz and the surrounding country with their drugs and medicines. I showed this copy to Rev. Dr. Hark, pastor of the Moravian Church at Lancaster. He examined it, and wrote an article for the *Christian Culture*, headed "Local Lore: From Abstracts Made from the Church Records at Lititz, Pa.;" and the following are extracts from that article. These extracts from the Church Records unveil to us leaflets of an unpublished history:

It is not easy to picture to ourselves the silent and peaceful halls of the antiquely dignified and beautiful old Moravian chapel at Lititz, occupied by any but a congregation of devout and reverent worshippers. Yet for months, during 1777 and 1778, they were filled with a motley throng of sick and wounded warriors, for whom the old stone building, then the "Brethren's House," was made to serve as hospital by order of Gen. Washington himself. And there it was, amid the groans and curses and prayers that disturbed the Sabbath-like calm of this modest and secluded little village, that the first Pharmacopœia ever published in America was compiled and writtten—a little work highly prized then for its learning and usefulness, but to-day valued above price for its antiquarian interest and great rarity.

Only a few copies of this rare and curious publication are known still to be in existence, and of one of these Dr. Charles A. Heinitsh is the fortunate possessor, which through his courtesy I have been allowed carefully to examine. It is a small 12mo. of thirty-two pages, excellently printed, from clear type, on hand-made paper, and originally was bound in paper covers. It is, of course, all written in Latin. It is of interest enough to warrant the transcription here of the entire title-page, as follows:

"Pharmacopœia / Simpliciorum & Efficaciorum, / in usum / Nosocomii Militaris, / ad exercitum / Fœderatarum *Americæ* Civitatum / pertinentis; / Hodiernæ nostræ inopiæ rerumque / angustiis, / Feroci hostium sævitiæ, belloque crudeli ex / inopinato patriæ nostræ illato debitis, / Maxime accommodata. / Auctore Gulielmo Brown, M. D. / Editio Altera. / Philadelphiæ: Ex Officina Caroli Cist / M.DCC.LXXXI."

This being translated reads thus: "Pharmacopœia of simple and efficacious remedies for the use of the military hospital belonging to the army of the United States of America, especially adapted to our present poor and needy condition, which we owe to the fierce cruelty of the enemy, and to the bloody war unexpectedly brought upon our country. William Brown, M. D., author. Second Edition. Philadelphia: at the office of Charles Cist. 1781."

A second copy of this edition is said to be in the library of the Pennsylvania Historical Society, Philadelphia; while the Library Company of Philadelphia is in possession of a copy of the first edition, bearing the imprint of "Styner & Cist, 1778," and described as a "small octavo," though evidently both editions are printed from the same plates.

In the preface, which is dated "Lititz, Mart. 12, 1778," attention is called to the distinction indicated between such remedies as are "to be prepared and compounded in the general laboratory," and others "to be mixed for the occasion at the offices of the hospitals." There is also complaint made of the lack of sufficient phials, on account of which many prescriptions "made use of only for the sake of elegance"* are omitted. A cursory examination of the eighty-four recipes for internal and sixteen for external remedies, shows that not a few of the roots and herbs found in the vicinity of Lititz were made use of at the hospital, together with other simple and so-called home remedies. Of course the list of prescriptions is almost ridiculously small when compared with those of modern pharmacopœias. To this may be owing the fact—and it may not—that during the little more than six months that the hospital was at Lititz, no less than one hundred of its inmates died. It is true, most of them were taken off by the "camp fever," or "hitziges fieber" as the diarist of the church, a copy of whose journal I have before me, calls it.

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* Applicable to our day.

"Jan. 18, 1778. Dr. Brown arrived from Bethlehem with a letter from Br. Ettwein. Dr. Brown wishes to live here with his family. He has the general oversight of the hospitals in this region." This is evidently the "Gulielmus Brown, M. D." who wrote our Pharmacopœia. But unfortunately that is all we know of him. Where he was from originally, and what became of him afterwards, is not stated in any of the records accessible to the writer. That he was at Lititz for some time, and that he diligently and usefully employed his time while there, is amply proven by his publishing the quaint little volume before referred to.

Mr. Maisch.—It may be of interest to state that this little Pharmacopœia six years ago was totally unknown in Philadelphia, and, to my knowledge, there is not in the medical libraries there an original copy of that work. In fact, the first volume of the Catalogue of the library of the Surgeon General's office of the United States army did not mention it, although it was an American work, printed in Pennsylvania. At that time I wrote to the librarian of the Surgeon General's Office, and he stated that since the publication of the first volume they had succeeded in procuring a copy of the first edition of this Pharmacopœia. Mr. Heinitsh has a copy of the second edition. Both, however, were published in the city of Philadelphia.

Mr. Heinitsh.—The second edition is published from the plates of the first, and they are both in the Philadelphia Historical Society.

Mr. Maisch.—On the title page of the first edition Styner and Cyst are mentioned as the printers.

At this stage of the proceedings the Virginia Pharmaceutical Association entered the hall, and the Section took a recess to hear the lecture of Professor Remington on the Metric System. At the termination of the lecture the Virginia Pharmaceutical Association tendered a vote of thanks to the American Pharmaceutical Association for the use of the hall, and the cordial reception accorded them.

The business of the Section was now resumed and the following paper was read:

THE CONSTITUTIONAL OBLIGATION OF CONGRESS REGARDING WEIGHTS AND MEASURES.

BY OSCAR OLDBERG.

The weights and measures of the United States are in a wholly anarchic condition. They were inherited from Great Britain in our colonial period. We have no standards provided by our own statutes. The weights and measures we use are governed in part by English law, in part by tradition, and in part by chance. Fixed standards of weight and measure are as necessary as fixed monetary standards.

If the monetary denominations of the United States were the English pound, shilling and penny instead of the dollar and cent; if we were coining sovereigns instead of eagles, it is scarcely possible that we would be content to permit the standards and denominations of our money of account to be governed as our weights and measures are—by English law, or by tradition, or by chance.

If the pound, shilling and penny were our monetary units we would have American laws declaring that the principal unit of our money of account shall be and shall be denominated a "pound"; that the pound, and the value of the pound, shall be a fixed amount by weight of coin gold or silver of prescribed degree of fineness; and that the shilling and the penny shall, respectively, be and represent certain aliquot parts of the value of the pound. We would go further. Our statutes would prescribe the manner in which our coin shall be minted, fixing the composition, weight, and limits of deviation in the weight, of each coin, and determining the extent to which each kind of coin shall be a legal tender of payment.

It is a matter of the highest importance to the credit and prosperity of the people that our money shall have a fixed value, which must, therefore, be prescribed and regulated by law, and not by any foreign law, since foreign law is not law to us, but by our own law.

Every civilized country has a legalized currency.

Next to money, and most intimately related to it, come the weights and measures. We cannot say that all civilized nations have laws establishing fixed standards and denominations of weight and measure, for, unfortunately, there is one exception, and one only. That exception is the proud American nation.

And yet, so important is this question of uniformity in the weights and measures in use among the people that the power to establish fixed standards for them was expressly conferred upon the Congress by the Constitution of the United States. Section 8 of Article I. of that instrument, in enumerating the special powers expressly reserved for Congress, places the power to establish fixed standards of weights and measures next after the vital powers to lay and collect taxes for the support of the national government, to borrow money on the credit of the United States, to regulate commerce, to provide a uniform rule of naturalization, and to coin money.

While other nations have not only provided uniform metrological values for themselves, but also steadily and consistently co-operated toward the ultimate establishment of a universal system, the Congress of the United States has not even exercised its constitutional power, or, rather, fulfilled its constitutional obligation, to establish fixed standards of weight and measure for our own use.

George Washington, Thomas Jefferson, James Madison, and John Quincy Adams, gave this matter special attention, and repeatedly urged that the duty imposed by the Constitution be performed, but their appeals were fruitless.

Our first President said in his first message: "Uniformity in the currency, weights and measures of the United States is an object of great importance, and will, I am persuaded, be duly attended to." But a century has passed, and the matter has *not* been attended to.

In his opening address to the first session of the Second Congress Washington again said: "A uniformity in the weights and measures of the country is among the important objects submitted to you by the Constitution, and if it can be derived from a standard at once invariable and universal must be no less honorable to the public councils than conducive to the public convenience."

Thomas Jefferson, while Secretary of State, prepared, at the request of Congress, several reports on the subject. Mr. Jefferson had, as the representative of his country, resided in Paris during the great Revolution. He was of course inspired by the nobler ideas of that stirring period, one of which was a universal language of weights, measures and money, in perfect harmony with our arithmetic. About the 20th of May, 1790, he had finished a report containing the description of a new and decimal system of weights and measures constructed by himself, which was the first decimal system of weights and measures ever devised and in every way as meritorious as the Metric System subsequently perfected in France. This report was submitted to the House of Representatives July 13, 1790. One of the several special committees appointed by the House during the sessions of the first and second Congresses to consider this important subject recommended the adoption of Jefferson's decimal system; but the report went over to the next Congress, was then sent to another special committee, and there the matter ended for the time being.

Washington called the attention of Congress again to the importance of immediate legislation in this direction, and more committees were appointed. Meantime the Metric System was adopted by France with the avowed purpose of finally securing, if possible, its adoption throughout the civilized world. On January 8, 1795, the President sent to Congress a communication from the French Minister descriptive of the Metric System and accompanied by copies of the provisional meter and kilogram. The first session of the Fourth Congress referred this communication together with Mr. Jefferson's report to another special committee which reported April 12th, 1796, by bill. That committee was decidedly in favor of some decimal system, but could not decide between Jefferson's system and the Metric System, expressing preference for units of length and weight not materially differing from the existing foot and pound. Its report, however, practically favored Jefferson's plan, and its bill provided for—the early introduction of *some* system? No, for the appointment of a commission to make experiments. This bill passed the House, but on its third reading in the Senate was laid over until the next session and so lost. Afterwards more special committees were appointed, reports received, and nothing accomplished. Then the discussion of the subject ceased until after the war of 1812.

President Madison in his message of Dec. 3d, 1816, brought the matter before the national legislature as follows: "Congress will call to mind that no adequate provision has yet been made for the uniformity of weights and measures contemplated by the Constitution. The great utility of a standard fixed in its nature, and founded on the easy rule of decimal proportions, is sufficiently obvious. It led the government at an early stage to preparatory steps for introducing it, and a completion of the work will be a just title to the public gratitude." The Senate responded to this earnest appeal, taking some further "preparatory steps" by referring the subject once more to the Secretary of State for report. Two years passed. Then the House of Representatives followed the example of the Senate. Another special committee of the House was appointed, and in due course reported certain resolutions providing for the adoption of fixed standards, and for the appointment of a commission to carry out the plans proposed, but this committee did not favor any new system. The resolutions were not adopted.

On February 22, 1821—thus on the anniversary of Washington's birth—an exhaustive report on the weights and measures was sent to Congress by John Quincy Adams, the Secretary of State. The whole subject was treated of in great detail, and the preparation of this report had required four years. At that time the Metric System had not yet been adopted by any government except the French, and was far from popular among the French people. Nevertheless Mr. Adams concluded that "final and universal uniformity of weights and measures is the common desideratum of all civilized nations," and that the universal establishment of the French system, although "struggling for existence even in the country which gave it birth," would be a "universal blessing," adding that "it would be worthy the dignity of the Congress of the United States to consult the opinions of all the civilized nations with whom they have a friendly intercourse, to ascertain, with the utmost attainable accuracy, the existing state of their respective weights and measures, to take up and pursue with steady, persevering, but always temperate and discreet exertions, the idea conceived and thus far executed by France, and to co-operate with her to the final and universal establishment of her system."

But while he thus looks forward to the ultimate adoption of the Metric System all over the world, and recommends to the Congress of the United States to labor steadily and preseveringly for the accomplishment of that end, he at the same time urges Congress to proceed *at once* to "such declaratory enactments and regulations as may secure a more perfect uniformity in the weights and measures now in use throughout the Union."

Things have changed since then. The Metric System is no longer struggling for existence; its universal establishment is almost achieved.

But Congress has failed to establish by law either the Metric System or any other system of weights and measures in our country. The elaborate reports and recommendations of Jefferson and Adams have been forgotten. So far as concerns national legislation in regard to our weights and measures, the past century has been a century of hesitation, indifference and failure. Yet, the subject is more important to-day than it was a hundred years ago. Indeed, it becomes more important every day. Our nation and its industry and commerce are growing more rapidly than ever, while the confused state of our weights and measures continues.

Instead of fixing the standards of weights and measures, Congress has evaded its duty and responsibility. Lacking the courage to decide between the past and the future, the old and the new, notwithstanding the absence of any present legally established system, our national legislators simply "resolved" that the Secretary of the Treasury furnish to the States and territories the "standard weights and measures" they might need.

In the absence of legalized standards, the Secretary of the Treasury adopted such *provisional standards* as seemed to him best. They were intended simply to fix and maintain the values of the denominations found to be in general use in the United States, until such time as Congress should see fit to pass the needed laws of establishing a permanent system.

The weights and measures we use are assumed to be: the units of length legally established in Great Britain; the old wine measures and Winchester measures formerly employed in England, but abolished by law sixty-four years ago in that country; the troy and avoirdupois weights; and the old English medicinal weights and measures, which were discarded in England together with the wine and Winchester measures.

The provisional standards adopted by the Treasury Department on the recommendation of Mr. Hassler, Superintendent of Weights and Measures, in 1832, for the construction of the "standard weights and measures" to be furnished the respective States, are the following: A brass scale prepared by a Mr. Troughton of London for the Coast Survey of the United States governs the standard measures of length; the Hassler gallon is the volume of 58,372.2 grains of distilled water at the temperature of 39.83° F., weighed in the air at 62° F., barometer at 30 inches; the Hassler bushel is the volume of 543,391.89 grains of distilled water of the same temperature and weighed under the same conditions as in the case of the liquid gallon; the weights are standarded by "the standard troy pound of the mint of the United States" to which we will have occasion to refer again.

It is not improbable that the Troughton yard is identical with the English yard; and it is generally assumed that the Hassler gallon is identical with the discarded English wine gallon of 231 cubic inches, and the Hassler bushel with the discarded English Winchester bushel of 2150.42 cubic inches, which assumption is probably *not* true.

Means for the accurate determination of values are indispensable to science, industry and commerce. Fixed standards of weight and measure are as important as a sound currency. They are not only "conducive to the public convenience," but necessary to the preservation of the public morals. Hence no civilized nation can afford to leave its weights and measures to tradition, usage and inference. Money can not be coined without reference to weight. Our statutes of necessity define the value of the dollar, or the dollar itself, by declaring that the weight of the gold coin or silver coin shall be a certain fixed number of "grains;" yet there is nothing in these statutes to define the weight of the grain itself!

The United States has one prototype standard adopted by Congress—not to insure uniformity in our weights, but solely for the purpose of regulating our coinage, although the Treasury Department adopted it to be also a model for the construction of the standard weights. It is a brass copy of the British troy pound, procured in 1827, and used as the standard of weight by the Mint of the United States for *forty-six years before it was adopted by law!* The adoption of this brass weight as the standard of weight by the Treasury Department in 1832 does not seem to have been regarded by Congress as sufficient, for in 1873 a law was enacted which now constitutes Section 3548 of the Revised Statutes of the United States, and reads: "For the purpose of securing a due conformity in weight of the coins of the United States, the brass troy pound procured by the Minister of the United States at London, in the year 1827, for the use of the Mint, and now in the custody of the Mint at Philadelphia, shall be the standard troy pound of the Mint of the United States, conformably to which the coinage thereof shall be regulated." But the Statutes do not say how that mint pound shall be subdivided, or fix the value of the ounce or of the grain in any manner; nor do they tell us what is meant by a yard, foot, inch, bushel, gallon, quart, pint or other denomination of measure, although the laws relating to imposts, postage and other matters name several of these units. If Congress imposes a duty of so much per yard, or per gallon, should it not also state what constitutes a yard, or what the gallon is? Or is English law, tradition or usage to decide? Since Congress did not regard the action of the Treasury Department as final in regard to the adoption of the standard troy pound, it can not regard the action of that Department final as to the adoption of the other provisional standards; and we learn about our denominations of weight and measure and their values, subdivisions and multiples, not from our laws, but from our school-masters.

The British troy pound is by British law divided into 5,760 equal parts called grains; it is, therefore, *assumed* that our troy pound is equally subdivided.

Should this brass weight which is denominated "the standard troy pound of the Mint of the United States," be injured or lost, it is to be presumed that the Minister of the United States at London will be instructed once more to obtain a copy of the English standard troy pound by the courtesy of the government of Great Britain, in order that the American people may be enabled to resume the proper regulation of its coinage. It may happen, however, that we will never again be able to obtain a copy of the English standard troy pound, for the British nation is preparing to get rid of it. The British Standards Commission has recommended that troy weight be abolished, and it will undoubtedly be done, for Great Britain now has two kinds of weights, while it has but one kind of long measure and one kind of measures of capacity.

In the absence of the adoption by Congress of a complete and consistent code of laws establishing the necessary denominations and standards of weight and measure, the respective states and territories have legislated more or less freely on the subject, and thereby added to the confusion. It has been decided that "the constitutional provision giving Congress the power 'to fix the standards of weights and measures' does not extinguish the right of the State over the same subject *until Congress shall have exercised the power conferred.*" (Brightly's Purdon's Digest of the Statutes of Pennsylvania.)

The following examples are sufficient to illustrate the degree of care and intelligence with which such laws have been passed:

The Revised Code of Maryland (Art. XXXII) says: "The standards for weights and measures of this State, except as otherwise provided in this article, *shall be such as are used at the custom house in the city of Baltimore.*"

The statutes of Alabama (Sec. 1217) say: "There is but one standard of measure of length and surface, one of weight, and one of capacity, throughout this State, which must be in conformity with the standard of measure of length, surface, weight and capacity *established by Congress;*" but Congress has never established any standard except the mint pound.

The penal code of Arizona (Sec. 862) says: "A false weight or measure is one which does not conform to the standard established by the laws of the United States of America;" but the laws of the United States of America are silent on the subject.

The same code of Arizona says further: "In all sales of articles which are sold in commerce by avoirdupois weight, the seller must give the purchaser full weight *at the rate of sixteen ounces to the pound.*" This is the only place in which the laws of Arizona intimate that there ought to be at least sixteen ounces in one pound avoirdupois; but it has nothing to say which affords any clew as to what constitutes either the pound or the ounce.

The great State of New York passed a law in 1829,* which forcibly illustrates what evils are possible while Congress neglects to exercise its constitutional power. The first four sections of this law are as follows:—

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* This law is published in the R. S. of N. Y., 1889, with this note:—Most, and probably the whole, of it, was superseded by L. 1851, ch. 134, but as some doubts may arise as to how much of it is in force, it is inserted here."

"Sec. 1.—The unit or standard of measures of capacity, as well for liquids as for dry commodities not measured by heaped measures, from which all other measures of capacity shall be derived and ascertained, shall be *the gallon*."

"Sec. 2.—*There shall continue to be two kinds of gallons*," etc.

Section 3 creates and establishes a liquid gallon, the capacity of which is the volume of eight pounds of water at its maximum density; and Sec. 4 creates a dry gallon of such capacity as to contain ten pounds of water at maximum density. Both of these gallons differ from any other gallon ever used in any other part of the world. It is highly improbable that either of these gallons was really ever used in New York; but upon this subject I have no information.

That law remained in force (on paper?) until 1851. In that year the State of New York adopted "the standards of weights and measures furnished by the United States." Nearly all the States have done likewise. But several of the States have described in their laws as among the standards thus adopted, a wine gallon measure of "231 cubic inches" and a half-bushel measure of "1075.21 cubic inches." The actual standard measures received and adopted were of course in conformity with the Hassler standards, according to which a gallon is the volume of 8.3389 pounds, and the bushel the volume of 77.6274 pounds, of water. Even if it were wholly true (and it is believed by experts *not* to be strictly true) that 8.3389 pounds of water measures 231 cubic inches, and 77.6274 pounds 2150.42 cubic inches, it will hardly do to try to regulate the specific weight of water by law. To regulate the capacity of the gallon by weight is practicable; it is also practicable to fix it by cubic measure; but certainly not by both methods simultaneously. It may as well be legislated that man's work *shall* be infallible.

There is one "standard measure of capacity" in general use in the United States which has been regulated (?) by law in the several states and territories in such a fashion that it is an open question whether it should not be regarded as a denomination of weight rather than of volume. I refer to the much abused bushel. We have already referred to the fact that the Treasury Department regards the bushel as the volume of 77.6 pounds of water, while several of the states declare that it is 2150.42 cubic inches. But the same states and, in fact, nearly all states and territories, have further passed laws fixing the contents of the bushel by weight of certain commodities, and their standards differ widely. A bushel of apples in Maine is 44 lb; but in Wisconsin 57 lb; a bushel of barley in Louisiana is 32 lb, but California law makes it 50 lb; a bushel of buckwheat is 40 lb in Dakota, but it takes 56 lb of it to make a Kentucky bushel; a bushel of clover seed varies in different parts of the country from 45 to 64 lb, oats from 26 to 36 lb, rye from 32 to 56 lb, potatoes from 50 to 60 lb, and salt from 50 to 80 lb. In Indiana a bushel of coal means 80 lb if the coal be mined within the state; but only 70 lb if mined elsewhere. No further proof would seem to be needed that these commodities should never be sold by the bushel, but always by the pound.

Several state laws also refer to "heaped measures," which for obvious reasons should be entirely discarded.

So great is the confusion concerning the weights and measures in use among us that such a book as Webster's Unabridged Dictionary still informs us that New York has a bushel of the capacity of eighty pounds of water, and that a pint, in medicine, is twelve ounces, although no such medicinal pint exists, while the two medicinal pints which do exist in England and the United States, being in daily use, each containing sixteen ounces (though not ounces of the same kind), are not mentioned in the book.

Now let us see what weights and measures are used in other countries.

Great Britain uses a disjointed system almost as bad as ours, but all its denominations and standards are at least fixed by law. Russia also has weights and measures of its own unlike those of any other country. *All the rest of the civilized world uses the metric system exclusively.*

But, although the Metric System is not compulsory in Great Britain and the United States, it is permitted by special enactments in both countries.

By act of Congress approved July 28, 1866, it was declared "lawful throughout the United States of America to employ the weights and measures of the Metric System." (R. S. Sec. 3569.) The same law (R. S. Sec. 3570) undertakes to fix the values of the respective metric units, which are well understood throughout the civilized world, by stating their equivalents in terms of the weights and measures in common use, which are *not* understood. The whole world knows what a liter is; but nobody knows except by tradition and usage what an American quart is, dry or liquid. Yet, American law fixes the value of the liter by declaring it to be 0.908 dry quart or 1.0567 liquid quarts. It would have been more to the purpose to fix the value of each quart in terms of the liter.

On the day preceding the date of the executive approval of the permissive act of July 28, 1866, Congress passed a joint resolution *requiring* the Secretary of the Treasury to furnish each State of the United States "one set of the standard weights and measures of the Metric System for the use of the States, respectively." As Congress did not provide for any material standards of the Metric System to be used as types, I presume that the necessary copies of the French meter and kilogram were procured from Paris through our State Department. All our States are probably by this time provided with the requisite standard weights and measures of the Metric System.

Under Section 3880 of the Revised Statutes, the Postmaster-General is *required* to "furnish to the post offices of the United States exchanging mails with foreign countries, and to such other offices as he may deem expedient, postal balances denominated in grams of the Metric System, fifteen grams of which shall be the equivalent, for postal purposes, of one-half ounce avoirdupois, and so on in progression."

During the Forty-fifth and Forty-sixth Congresses, the Committee on Coinage, Weights and Measures of the House of Representatives gave the question of the introduction of a National System renewed attention. Reports were called for as usual, and as usual without any practical result. Many purely imaginary and some real difficulties were urged against a change—not against the Metric System, but against *change.* One of these reports gravely asserts that "detrimental confusion" would result from the adoption of the Metric System, particularly in the commercial relations of this country "with Great Britain and other countries where the system of weights and measures is the same as that of the United States." But the avoirdupois weight and the measures of length are the only weights and measures in use in both countries; their measures of capacity are not the same; and no other country uses any of the weights or measures of either England or America. The United States took part in the formation of the International Bureau of Weights and Measures established by the International Metric Convention held at Paris May 20, 1875. The object of that Bureau is to facilitate the universal adoption of the Metric System, and to furnish, compare and verify prototypes of the Metric Standards and copies of the same. Among the countries which co-operate and contribute to the maintenance of this Bureau are Germany, Austria-Hungary, Belgium, the Argentine Republic, Denmark, Spain, the *United States* of America, France, Italy, Peru, Portugal, *Russia*, Sweden and Norway, Switzerland, Turkey and Venezuela. Thus, of the three civilized countries not yet using the Metric System to the exclusion of all other weights and measures, two are members of the International Metric Bureau, Great Britain alone being not represented.

But in Great Britain, too, there has been and is a strong movement toward the ultimate adoption of the Metric System. On the 8th day of April, 1862, the House of Commons appointed a select committee to consider the practicability of introducing "a simple and uniform system of weights and measures, *with a view not only to the benefit of the internal trade*, but to facilitate trade and intercourse with foreign countries." That Committee unanimously recommended the introduction of the Metric System, bringing in a bill on the 13th of May, 1863, which provided that the exclusive use of that system be made *compulsory after three years.* The bill passed the House of Commons by a large majority vote, but was never acted upon by the House of Lords. A year later, another bill passed both houses of Parliament rendering the use of the Metric System permissive, but not compulsory.

The fact that the world has a decimal arithmetical notation renders the ultimate adoption of decimal weights, measures and money inevitable.

The only countries that do not now have decimal weights and measures are those which have not yet adopted the Metric System. The United States, Great Britain and Russia must make a *change* in order to secure the advantages of weights and measures in harmony with our arithmetic. The reason they have not already adopted the Metric System used in all other civilized countries is not that any other existing system is better, or even as good, but that they are unwilling to make *any change*, because of the temporary trouble it necessarily involves. Endless trouble and confusion have always been predicted as the unavoidable results of change; these difficulties are imaginary. Why did not these prophetical disasters follow the adoption of the Metric System in Germany, Austria, and all the other countries which have long ago introduced the Metric System to take the place of the weights and measures they previously used? That no change can be made without *some* effort and temporary inconvenience, is undeniable; but if we do not sow, neither shall we reap. The benefits of the change will appear far more rapidly now than they came to France and even to Germany. They were willing to make a sacrifice for the benefit of of future generations. Are the United States, Great Britain and Russia struggling against fate in the hope that the effort and inconvenience might fall on our children instead of upon ourselves, on the principle that as posterity can do nothing for us neither should we do anything for posterity? If so, they are short-sighted as well as selfish. The generation that adopts the Metric System now will live to enjoy its benefits.

A perfect system of weights and measures, worthy to be universal, must not only be decimal, but must also be characterized by the simplest possible relations between its denominations of length, capacity and weight, respectively. The units of measures of capacity must bear a simple relation to the units of length on the one hand and the units of weight on the other. This correlation of the units is one of the great merits of the Metric System, and no other decimal system that might be devised would equal the Metric System unless it had equally correlative units. Other decimal systems have been actually introduced from time to time in several countries, only to be abolished again in favor of the Metric System. This correlation of the units is a highly important point, which scientific men all understand, but which is generally ignored by a great majority of those who argue against the adoption of the Metric System to take the place of the old. If we are ready, then, to acknowledge the immense value of a universal system of weights and measures, we must also admit that only a *perfect* system will ever be universally adopted. The world would never adopt the weights and measures of Russia, nor those of Great Britain, nor still less the alleged weights and measures of the United States. The peoples who have already adopted the Metric System number over five hundred millions, while the three nations which have not adopted it number less than half that population, and two of these countries, with over one hundred million people, have made the Metric System permissive, while the third has committed itself in favor of the ultimate adoption of that system, by co-operating in the establishment of the International Bureau of Weights and Measures.

The Metric System is actually employed in the United States by the Marine-Hospital Service, the Coast and Geodetic Survey, the Medical Department of the Navy, and other scientific bureaux of the government, and by scientific men generally. The American Association for the Advancement of Science has persistently labored for its general introduction, memorializing Congress more than once in favor of its adoption. The American Medical Association, the American Association of Architects, the Association of Civil and Mining Engineers, the Association of Master Mechanics, the Pharmacopœial Convention of the United States, and the American Pharmaceutical Association—all have placed themselves on record as advocating the adoption of the Metric System. The Pharmacopœial Convention which met at Washington last May, consisting of delegates from the medical and pharmaceutical colleges and societies in all parts of our country, unanimously ordered that the weights and measures hereafter used in the Pharmacopœia of the United States shall be those of the Metric System, and no other.

No difficulty whatever will be experienced by any person of ordinary intelligence in learning to use the Metric System, if he will.

I have taught a thousand pharmaceutical students to use it, and have never met with one student who could not readily learn it.

The use of the Metric System for *all* purposes may not be adopted as easily as it is adopted in chemistry, pharmacy and medicine, but it is nevertheless irresistible. The only serious difficulty which arises from a change of system seems to be that attendant upon changes in land measurements. If it be deemed best, the old land measures upon which the public surveys are based and by which the titles and conveyances of lands and lots are defined can be left untouched until such titles and conveyances shall cease to exist.

It is in commerce and industry, and in science, that a universal decimal system is especially valuable. Lands and lots are permanent and immovable, ownership in them is traced through generations, they are not frequently transferred, and smaller lots are seldom divided. But there is no *permanent* private ownership in anything else that can be measured. All other kinds of property, as machinery and all movable commodities, are produced and distributed, and are perishable. In all computations attendant upon foreign, inter-state and local trade and transportation, a universal decimal system would indeed be "a universal blessing."

Suppose the merchant who sells cloth should be suddenly deprived of his yard-stick and given a meter-stick instead. He would simply have to use the meter-stick, sell the meter at one-ninth more than the selling price of the yard, and order all his cloth by the meter instead of by the yard thereafter. His customers might for a generation continue to ask for cloth by the yard ; but the new yard would be quite as convenient to them as the old.

If the grocer should be obliged to exchange his quart measure for the liter, he would find the liter measure quite as handy, and would only have to charge six per cent. more for the new quart. In the same way would he find that it is not more difficult to weigh sugar with metric weights than with avoirdupois weights, and if his customer calls for a pound of sugar it would not occasion any difficulty were he to sell a half-kilogram instead, charging ten per cent. more for it than he formerly charged for the pound. After a very brief time, the merchants would hardly be conscious of the fact that any change had taken place.

In 1881 I visited my native country. The Metric System had then been the only legal system of weights and measures for years. No other weights and measures were permitted. Yet, one of my first experiences on that visit was to hear a dealer speak of quarts instead of liters in referring to a delivery of milk. When I expressed surprise, saying that I supposed the Metric System to be the only one used, the reply was that the liter was meant when the Swedish name for the quart was used, and that the liter-measure was the only quart-measure in existence. But as names do not constitute the Metric System, it makes little difference whether the meter be called a meter or a yard, whether the liter be termed a liter or a quart.

In some countries it was deemed necessary or useful to prepare the way for the adoption of the Metric System by the temporary use of compromise systems. This was done in several German countries, Sweden, Switzerland, etc.

In Switzerland a new *foot* was adopted which was exactly 0.3 meter. The Ordnance Board of the United States recommended (1877) the adoption of the same foot in our country. This would have given us a metric yard of 9 decimeters, which would be only about half an inch shorter than the English yard ; a multiplication by $\frac{9}{10}$ would convert yards into meters and a multiplication by $\frac{10}{9}$ would convert meters into yards. A cube upon $\frac{1}{9}$ of that new yard (4 new inches), or 64 new cubic inches, would then correspond exactly with the liter, and might be called the new quart. If then the weight of one new pint (or one-half liter), which would be exactly 500 grams, should be called the new pound, the new cubic inch of water would weigh exactly one-half new ounce, and the new ounce would be about ten per cent. larger than the avoirdupois ounce, or almost the exact equivalent of the troy ounce. But this would after all only give our weights and measures a simple relation to the units of the Metric System, and establish simple relations between our measures of length, capacity and weight, without giving us decimal sub-divisions, which are necessary to bring our weights and measures into harmony with the universal system of arithmetical notation.

If any sort of compromise is to be tolerated at all, let it be simply the permissive use of the *names* of the old units to designate the new, to a limited extent.

The International Metric Bureau has supplied the United States with copies of the new international prototypes of the meter and kilogram. These copies are made of irido-platinum. The meter is regarded as an absolutely accurate copy of the "Meter of the Archives" at 0° C. The kilogram weight sent us (No. 20) is copied from the "Kilogram of the Archives," and has an ascertained correction of —0.039 milligram.

It is conceded and evident that whenever Congress does take some action to provide our nation with proper laws and consistent standards of weights and measures, the old customary weights and measures will not and cannot be retained. The ultimate adoption of the Metric System seems inevitable. We have now no legalized standards and denominations at all, unless Sections 3569 and 3570, R. S., are to be construed as making the metric weights and measures our only legalized system.

This then is the opportune time to take another and decisive step. It would be in the greatest degree desirable to declare by law the newly arrived copy of the Meter of the Archives to be the only and absolute basis and prototype standard of the United States for all weights and measures hereafter to be used in our country. The meter defined by this irido-platinum bar should be declared to be *the* meter of the United States. Provision should be made for its preservation, and a sufficient number of accurate copies should also be provided as working standards for use in comparing and verifying the standard weights and measures furnished the States, respectively.

The Metric System could now be adopted by law to take effect in 1892 or 1893, in commemoration of the quadri-centennial of the discovery of the American continent, to be used at least in all governmental transactions and in foreign and inter-state commerce and transportation.

May we not reasonably expect Congress now to put an end to the present chaotic condition of things, and to place this Nation on the same footing with Germany, France, Central and South America, and the rest of the Metric world?

I believe that this Nation has it in its power to decide *now* upon the immediate establishment of the Metric System throughout the world; for if this country should set the date for its adoption by our people in relation to imports and exports, the postal service, inter-state transportation, etc., Great Britain and Russia must soon follow the example.

The recent sitting of the Pan-American Congress at Washington, and the results which it is hoped may ultimately grow out of its deliberations, should remind Congress that the countries represented in that Conference have long since and irrevocably adopted the Metric System.

Surely Congress will not permit this grand opportunity to pass. Let it now effectually co-operate with the rest of the civilized world "to the final and universal establishment of the metric system," and at the same time fulfill its constitutional obligation to provide for the people of the United States a code of complete, specific, and consistent laws establishing "fixed standards of weight and measure"—an obligation imposed a century ago.

It would, indeed, "be worthy the dignity of the Congress of the United States" to celebrate the four hundredth anniversary of the discovery of America by conferring upon mankind now, so far as it can, the "universal blessing" referred to by John Quincy Adams.

Illinois College of Pharmacy, Chicago.

Accompanying this paper the writer submits the following resolution, the adoption of which he desires to move:

Whereas, The Constitution of the United States imposes upon Congress the duty of establishing fixed standards of weights and measures for the use of the people; and

Whereas, The customary weights and measures in use in the United States are arbitrary, unsystematic, inconvenient and indefinite, being governed partly by English law, partly by tradition, and partly by chance; and

Whereas, No laws of the United States exist establishing a National System of Weights and Measures or fixing the values of the customary units; therefore be it

Resolved, by the American Pharmaceutical Association, that Congress be and is hereby respectfully requested to consider without unnecessary delay the importance of legislation upon this subject; and further

Resolved, That it is the sense of this Association that it would be worthy of the dignity of the American Nation to celebrate the four hundredth anniversary of the discovery of America by the adoption of the decimal system of weights and measures in all governmental transactions and for purposes of foreign and inter-state commerce, to take effect on the date of the landing of Christopher Columbus on this continent, and

Resolved, That copies of these preambles and resolutions be forwarded by the Secretary of this Association to the Speaker of the House of Representatives of the United States, to the Chairman of the Committee on Coinage, Weights and Measures of the House of Representatives, and to the Superintendent of the Bureau of Weights and Measures.

MR. MARKOE.—Does the Constitution of the United States impose upon Congress the duty or the power?

MR. OLDBERG.—It gives Congress the power to establish fixed standards of weight and measure. Section VIII., Article I., of the Constitution, in enumerating the special powers expressly reserved to Congress, includes, "The power to establish fixed standards of weights and measures;" and this power of Congress has been again and again referred to by George Washington, and the second and third Presidents of the Republic, who called the attention of Congress not simply to the power placed in its hands, but stated it to be the constitutional duty of Congress.

MR. REMINGTON.—This is a very important subject, and it seems to me that something should be done by the American Pharmaceutical Association in this matter. These resolutions are very comprehensive; they mean a great deal, but they are good. I don't know now what will probably be the best thing to do, but it seems to me, on first thoughts, that the best thing to do would be for the American Pharmaceutical Association to appoint a committee not only to consider what is best to be done, but how best to carry out the object in view. We may resolve many things here, and refer them, and that is the end of it; but if we want Congress to do anything, we should appoint a committee to go to Washington and present these matters in such a way as will secure the object we are working for. Now, if this Association feels that it can, in view of the adoption of the metric system by the Pharmacopœia, take up these resolutions, I think with Professor Oldberg that there is more likelihood of getting the metric system established in this country at the time of some great celebration, such as the discovery of America, than at any other time. Such changes are best accomplished at some great anniversary; it is our way, the genius of the nation. It seems to me to be an excellent idea. I therefore move that a special committee be appointed to take into consideration and report upon these resolutions.

MR. MARKOE.—In seconding that motion, I would like to say a word in regard to the adoption of the metric system by the Pharmacopœial Convention, which was, in a certain way, the most important move that has been taken in this direction. Professor Lindley told me, in Washington, that the adoption of the metric system by the Convention had been the most important step yet taken in this country, inasmuch as its adoption by the Pharmacopœia compelled its use by pharmacists, and brought it to the attention of the general public in a way that its adoption by such bodies as the American Institute of Architects or Civil Engineers could not do. The adoption of the metric system by the Pharmacopœia compels the pharmacists to use it, and of course brings it directly into use by physicians. I am very sure, however, that if we appoint a committee to go to Washington alone it cannot do much good. I think that such a committee can act, and ought to act, in concert with similar committees that will be gladly appointed by other scientific associations throughout the country; and if we go to Washington, not only as a committee, but as joint committees, representing all of the interests that desire the adoption of the metric system, we can go with such a respectable power that we shall be courteously treated. I can give a case in point. In Boston we have an Association called the Executive Business Association of the City of Boston, composed of three delegates from the Board of Trade, from the Boston Druggists' Association, the Master Builders' Association, and all the different Associations of Boston, who meet once a week, and when we wish to bring any business matter to the attention of Congress, we don't go as delegates from this or that Association, but send a Committee from the Executive Business Association, which represents the concentrated power of the eight hundred and fifty million dollars in property owned by Boston, which means something.

MR. OLDBERG.—I should have stated that it ought to be humiliating to be obliged to confess that this nation is the only nation which does not have weights and measures with fixed standards.

MR. CORNELL.—I do not think Congress will be opposed to the passage of a law in relation to the metric system; but I think the principal difficulty in getting it through will be on account of the linear foot. You know all the great cutting machines of the United States are based on the linear foot, and that is the case with the other mechanical arts, and that has to be overcome.

MR. HALLBERG.—I fail to catch the drift of Mr. Markoe's suggestion.

MR. MARKOE.—I believe in the appointment of a committee, but believe that when appointed it should not merely go as our own committee, but should confer with such bodies as the American Society of Architects, the American Association for the Advancement of Science, and the Bureau of Weights and Measures at Washington; and, if possible, get them to appoint committees and then unite. In that way, more power will be brought to bear than by merely acting alone. Congress may not be opposed to a thing, but without a strong delegation there is very little interest aroused. The way to work is through your Representatives. Get the various sections to instruct their Senators and Representatives as to the matter, and make them feel that votes are dependent upon it, and they will pay attention.

Mr. Hallberg.—Mr. Cornell has referred to an objection which is a very important one, and is sufficient to prevent the adoption of the metric system for a long time; but that is not what we are attempting. We are trying to induce the Government to pass a law which will make it compulsory in the governmental service. Now, inasmuch as at least one bill has been introduced in the House of Representatives over six months ago, with reference to making the metric system compulsory in the postal service, I think that that is a very good start in the proposed legislation. If we could get the Post Office Department to adopt the metric system, so that whenever any citizen of the United States desires to send a letter he will have to buy postage stamps of one or two cents—whatever it might be—for 30 grams of matter, the metric ounce, that would give us a start. In the course of ten years it would popularize the metric system more than anything else that could be devised. In my opinion, this committee, when appointed, should be composed of men who are as near Washington as possible, so as to be able to go there without trouble. I would like to refer to Mr. Wm. S. Thompson as being a suitable member of that committee. I believe he can do more than any one else. I would ask that every member attending this meeting use his influence with his local association, and get the influence of other organizations to pass resolutions, and also to write to their Representatives and bombard them as much as possible, for I believe we have a better chance of succeeding now than we have had for some time past.

Mr. Main.—I think the suggestion in regard to appointing a committee is a good one. For the last twenty years this Association has recommended the adoption of the metric system. The good that we can accomplish by the appointment of a committee is this: that if we send them to Washington, and they do their duty, they will find out what objections exist as to the adoption of the metric system, and we shall know in what way to work. It is very evident that there are great objections among a certain part of the community to its adoption. If we know what the objections are, we shall set our minds to overcoming them, and thus secure, in the end, the adoption of this excellent system.

Mr. Good.—I agree with everything that has been said on this point, but all this Section can do is to see that the Association appoints such a Committee. I think this Section is not the place where the Committee should be appointed, but the Section can recommend the appointment.

Mr. Remington.—I would, therefore, amend and move that this Section recommend that the American Pharmaceutical Association appoint a committee to consider the resolutions offered by Professor Oldberg, and that it is also the sense of this Section that the resolutions be adopted, and that the Committee take such steps as in their judgment they consider to be best suited to accomplish the object we have in view.

The motion was then put to a vote and carried unanimously.

Mr. Sayre then presented the following paper:

LOCO–WEED.

BY L. E. SAYRE, PH. G.

It may be remembered by some of the members of the Association that when I made my last report upon the Loco or Crazy Weed, I suggested that there was some probability of my performing some physiological experiments upon cattle and horses, in the field and upon the ground where the so-called loco disease is prevalent. Thus far I have been unable to obtain the necessary appropriation from the State to conduct such experiments; I have therefore been obliged to be content with such work as my own limited means would allow.

During the present summer I have visited the northwestern part of Colorado, where recently much complaint has been made of the loco weed. I may state just here that during the past winter I have had some correspondence with Dr. O'Brine, Professor of Chemistry of the State Agricultural College, at Fort Collins, Colo., who kindly offered to help me in the investigation. Prof. O'Brine's assistance is certainly very valuable, inasmuch as the weed grows abundantly in his immediate vicinity, and he is without difficulty able to experiment with the fresh plant. My visit to Fort Collins was made for the purpose of consulting Dr. O'Brine with regard to his chemical investigations upon the fresh plant, just completed. We together had pre-arranged to make some post-mortem examinations of locoed animals, but this plan was interfered with by Prof. O'Brine being summoned to attend court while I was on the ground.

I had, however, the opportunity of seeing the result of Prof. O'Brine's analysis, which I will report in brief. I should say at the outset that *Astragalus mollissimus*—the loco of Kansas—does not grow in this portion of Colorado. There are two species of *Oxytropus* and several species of *Astragalus*, chief among which is the *Drummondii*, having a reputation similar to the *mollissimus*, fully described in my former paper.

Prof. O'Brine analyzed six different species, following Dragendorff's method of plant analysis. I shall not extend this report to undue length by giving details and results of each of the six, but as the results were somewhat similar, will confine myself to reporting the result of the analysis of *Astragalus Drummondii*.

The whole plant, excepting the root, was collected on June 23d, while the fruit was unripe. The following is the analysis as reported:

Moisture 8.55.
Ethereal Extract 3.88.
Alcoholic Extract 10.38.
Chloroformic Extract .43.
Albuminoid Nitrogen 9.95.
Crude fiber 39.60.
Crude Ash 8.68.

Carbohydrates 47.59.

Each of these residues was examined for principles of an active or poisonous character, with negative results.

With a view of determining the symptoms and *post mortem* appearances of the disease, President Ingersoll, of the Agricultural College, visited one of the ranches in El Paso county. He set aside, for his experiments, a number of sheep that were locoed. He found the animals showing a great degree of emaciation, and also showing to its greatest degree the so-called loco habit. Upon making *post mortem* examinations he found the following conditions: The gall bladder was filled with a greenish-colored bile. In the duct running from the gall bladder to the small intestines, he found a mass of tape worm *(taenia expansa)*. The small intestine he found filled with a mass of the worms, varying in length from six inches to five and six feet. Some other abnormal conditions were found, but, according to President Ingersoll's statement, all of these could be accounted for, and the "locoed" condition of the animal, by the presence of the worms. In other words, it seems to be the opinion of President Ingersoll that the worms were the cause of the locoed condition.

The same gentleman tried the experiment of feeding the loco to a young lamb, about two months old, that was being raised on a bottle. Twenty pounds of loco were cut just below the crown, and that contained no seed; in other words, just the portion that the sheep were getting to eat. This was placed in a wash boiler and a very concentrated decoction made of it. The expressed and strained liquid was fed to the lamb from the bottle just as the milk had been. It was given as follows: Seven tablespoonfuls at 4:30 p. m., five tablespoonfuls at 5:30 p. m., four tablespoonfuls at 7 p. m. The next morning the bowels were slightly loosened, but nothing more could be seen. The next day the concentrated decoction was continued at regular intervals, and also on the third day, until thirty-nine tablespoonfuls were given in place of the regular allowance of milk, and which constituted all the food that it got for forty-three and one-half hours. There were no deleterious effects that could be noticed, and President Ingersoll saw and very carefully examined the animal about two weeks afterward.

I have some other interesting statements with reference to *post mortems* of horses said to be locoed, which I shall make to the Kansas State Board of Agriculture. These would prolong this paper unduly. Will state, however, that at the base of the brain, in several instances, there is found a blood-clot more or less organized—the hemorrhagic effusion, or blood-clot, completely covering the base of the brain, and held to it by well organized tough fibers.

My own chemical experiments during the year have been published in Notes on New Remedies.

MR. REMINGTON.—Was that extract made with heat, by the cooking process?

Mr. Sayre.—Yes; and that is the criticism I have to make on the experiment. The extract was made by macerating the loco weed in cold water, and, straining the infusion, adding still more water, and exhausting it in this manner with a gentle heat until a large quantity was obtained, concentrating this at a low temperature. I suggested to the Professor that this might account for the want of results, that it is well known that the active substances become inert by boiling, but he said that the neighboring ranchers said that the experiment had been successfully tried before, producing locoism in the animal. I suppose you are aware of the fact that we have a literature on our shelves on this subject, in which it is stated that a decoction of concentrated loco will produce this effect upon cats. I refer to an article written very recently on this subject, in which the animal, a cat, was brought into the demented condition in the space of two or three hours by partaking of a simple decoction of loco. This experiment, while it does not cover the ground completely, answers some of the questions which are at present interesting us.

Mr. Hallberg.—Was the loco used quite fresh?

Mr. Sayre.—Yes; the freshly gathered plant. The thirteen sheep that were said to be locoed were corraled; the ranchman said, "I will make you a present of these animals, and you can do what you please with them." The first one was in a very bad condition, and a post-mortem examination revealed the fact that the duct leading to the liver was completely clogged with tape-worm. To make a long story short, he waited until the symptoms developed themselves in the other twelve, and he found upon a post-mortem examination the same conditions existing as in the first. Now, it is well known that tape-worm is a native of the lamb, and also of the cat. We can scarcely dissect a cat without finding tape-worm in the alimentary canal, but its abnormal increase at this point they said would account for the symptoms. Now, to show you how difficult it is to decide upon this question from a physiological point of view, some other experiments have been tried in this connection, and they found that there were two tubercles at the base of the cerebellum, and that this abnormal growth will sufficiently account for all the symptoms in the horse and in the cow. Thirteen or fourteen post-mortem examinations have been recently made. They say this disease is probably not due to the poisonous effect of the loco, but to some condition that is brought about by some cause, they know not what, leading to disorders in the system, which produce these symptoms upon the base of the brain. The question, however, is by no means solved. We have to go on with this work, and do what we can in the future.

Mr. Hallberg.—I thought in your last investigation there was a reference made to the effect of the loco upon a wound of the animal that came in contact with the plant, conveying it to the blood, and affecting the system of the animal in that way, and not through the stomach.

Mr. Sayre.—I have no recollection of stating that.

Mr. Rusby.—It seems to me that the investigations with respect to this matter have not been quite as accurate as they might have been. It would appear that the question could be settled by taking some animals that had not been locoed, and treating them with the loco, and finding what results would follow. I also think it would make a great difference what part of the plant is used. An intelligent observer in the West told me that although the lambs might eat this loco weed during the early season, when it was abundant, without bad results, yet later in the season, when the tops had been eaten off, and the animal, having acquired a taste for the loco weed, dug down to the roots, poisonous symptoms would develop. Now, as far as I know myself, all the investigators have not separated the root from the top and given the tops to one and the roots to another; neither have I seen any reports as to the root having been analyzed separately from the top.

MR. SAYRE.—You will find that in the reports of the experimental station at Washington.

MR. RUSBY.—In one instance, I was informed, the ranchers at one point in the West suffered from one species of this plant, and at another, fifty-five miles distant, a different species caused the trouble, so that it seems to be due to a good many plants.

MR. SAYRE.—In Iowa they say that the loco of that region is a Crotalaria. They do not complain of the Astragalus or the Oxytropus Lamberti.

MR. RUSBY.—I think my informant said one of these was the Scutellaria, which belongs to a different order of plants; but in any event, when we find that all these symptoms are produced by plants closely related, then we are obliged to consider whether, when we have isolated this substance, it would be identical in these different species. I have examined these plants to see whether any insects were present on them, and have seen the time when none could be found. Up to the present time, although we have not isolated this substance, I am sure it is due to some natural constituent of the plant.

The Section now adjourned until three o'clock in the afternoon.

SECOND SESSION.—WEDNESDAY AFTERNOON, SEPTEMBER 10.

The Section was called to order at 3 p. m., by Chairman Whelpley.

The election of officers for the ensuing year took place, and the nominations made at the previous session being unanimously approved, the Secretary was directed to cast a ballot for the nominees. Mr. Patch was then declared elected Chairman, and Mr. Hallberg, Secretary, for the ensuing year.

MR. HALLBERG.—I have been an attendant at our meetings for the past eleven years, and in that time I have not come before the Association for any office in its gift. I believe it was simply because of the fact that the Association desired to keep me in a position where they could always hear from me, that this election was arranged. I will fill that position as well as can be expected under the circumstances, and if the members get enough of it, they will want to place me in a position where I will have to keep quiet.

The Chairman stated that Mr. Eccles had two papers requiring an hour or more to read, and which Mr. Eccles had stated could not be presented in abstract. The Committee did not feel like taking the responsibility of presenting one paper to the exclusion of others, and desired to refer the matter to the Section.

Mr. Heinitsh thought the time would be too long. Mr. Seabury suggested to have the shorter papers read first, and afterward give Mr. Eccles two hours for the reading of his papers. Mr. Sayre stated that several members were very desirous of hearing Mr. Eccles's paper on pepsin.

Mr. Seabury moved that the shorter papers be taken up first. The motion was seconded, and carried by a rising vote.

Mr. Tsheppe presented the following paper:

ALBUMINATE OF IRON AND ITS PREPARATIONS.

BY DR. ADOLPH TSHEPPE.

Since a few years some novelties in so-called indifferent iron preparations are being introduced from Germany, now so prolific in new additions to the materia medica. I have special reference to preparations of albuminates and so-called peptonates of iron, which, by the growing favor with which they are received here, have become of sufficient importance to awake the interest of the pharmaceutical profession.

These preparations are not protected by patent rights or trademarks, so the labor of their investigation is somewhat more profitable than of protected articles, as it is amply repaid by finding the ways and means of preparing them ourselves, not counting in the benefit of acervating knowledge. Besides, their chemistry is less intricate than that of the more elaborate chemicals now so steadily appearing, which brings them more into the sphere of the average chemical ability of the professional pharmacist, whose knowledge of the possibilities of the higher spheres of applied chemistry is under the prevailing circumstances of the drug trade in this country necessarily limited.

These preparations are now not altogether new, their formulæ have not been kept secret either, but to the contrary, prescriptions to make them have been as liberally bestowed as the sands on the seashore, in a spirit of disinterestedness, which has been the time-honored custom in the old world, for scientific labors.

But the time, it seems, also in old Germany is passing, when men work for fame more than for money, since it has been found of late that one may attain both, if the work done be worthy of fame and there be money in it.

The albuminate of iron was constructed as far back as 1877, by a Dr. Friese, and has been the object of investigation and discussion of a number of able writers at home. But altogether such flagrant discrepancies are still existing between formulas, constitutions and appellations of these preparations, that the subject to-day is far from being exhausted or the question settled, and the old quarrels might be renewed on the slightest provocation.

In this country, to my knowledge, so far, they have received no serious attention, and I hope by introducing this theme to this body, to promote acquaintance with the subject, and by experiences gained in its study, to help to diffuse the knowledge so that further investigation and discussion may be invited.

It is a good many years now since it had been discovered that some organic acids, like the citric and tartaric, prevent the precipitation of ferric hydrate by potash; and that this property is not confined to bodies of a decided acid nature, but is also shared by some indifferent bodies, like sugar, has been known long enough to have a formula for soluble saccharate of iron introduced in the first edition of the German Pharmacopœia. This preparation, according to the officinal formula, is obtained by a rather devious route, which may be greatly simplified; but other analogous substances like dextrin, gum arabic, glycerin, albumen and its derivatives and congeners, do not show such difficulties as sugar, and the working of the chemical transformation with them is more translucid. Solutions of these bodies in mixture with ferric salts give on neutralization a precipitate which constitutes a chemical combination of the substance employed with iron: a further addition of alkali redissolves the precipitate, the alkali now entering into the combination.

Before solution in alkali, the precipitate may be freed of the by-products of the chemical exchange, by straining and ablution with water, before the addition of the alkali, in order to obtain the final product in a state of purity. The same may be attained by subjecting the alkaline solution to dialysis.

The precipitate, except in the case of albumen, is also soluble in diluted acids, but this solution only represents again the original mixture.

In place of the normal ferric salts, basic ferric salts may be employed, which behave the same as the normal; only as it is the acid of the ferric salt which is replaced by the substance used, the new compound will contain a larger amount of iron than those obtained from the normal salts.

These basic iron combinations seem even to be more stable than the normal combinations, and are produced generally, when an appropriate substance, being a crystalloid, is mixed with normal ferric chloride, and potassa gradually introduced. By this slow manner all the iron is first transformed into basic ferric chloride, before the combination with the substance is effected; glycerin and sugar form typical examples of this behavior, and the modus operandi of the preparation of the saccharate of iron adopted by the German Pharmacopœia, clearly points to the fact that a basic saccharate is either aimed at or unintentionally obtained.

Colloids like albumen, dextrin or gum acacia, prevent the formation of basic iron salt. The albuminate is directly precipitated on addition of alkali to saturation of the acid, showing that a combination is formed, having the constitution corresponding to the normal ferric salts.

But if in the case of crystalloids the manner of addition be reversed, adding the iron mixture to an excess of alkali, a solution corresponding to the constitution of the normal salt is also obtained.

This procedure is not admissible in all cases, as iron hydrate may be precipitated in place of the expected compound. But the normal form may also be obtained from the alkaline solution, prepared as before, by precipitation by acids or more certainly by dialysis.

The passage of the normal to the basic salt may be judged by the change of color of the solution, which passes from that of pale sherry to that of old port.

The percentage of iron in these compounds is obviously not constant.

For albuminates the amount of iron oxide obtained by calcination of the dried precipitate of the albuminate varies from $\frac{1}{12}$ to $\frac{1}{3}$ and all the intermediate fractions, according as the normal or basic chloride or mixtures of both be employed.

But it may vary still more ; alkaline solutions may contain a large excess of albumen, acid mixtures an equally large excess of basic iron. The excess of albumen is not eliminated by precipitation, as is the case with sugar or glycerin, because it is changed in this process into a derivative, which is itself precipitable.

For a specific solution of a ferric salt, the variation of percentage of iron in the compound is a small one, and the proportion in which an appropriate substance combines with the iron of this specific solution may be satisfactorily ascertained.

This determination is effected by adding to a measured volume of a one per cent. solution of the substance to be tested, gradually measured volumes of equally diluted solution of ferric chloride, adding after each trial sufficient surplus of caustic alkali. Each test, between additions, has to be made with a fresh sample. The limit of addition is reached when ferric hydrate is precipitated, then the proportions of the volumes of the two solutions indicate the ratio in which the substance in hand combines with ferric chloride.

One part by weight of each of the following named substances was found to combine with the following parts of solution of ferric chloride, U. S. P.

Glycerin	0.92
Cane sugar	0.42
Mannit	1.72
Egg albumen	1.05

The proportion of basic chloride of iron (*i. e.*, dialyzed iron) in solution of usual strength, (5 per cent. of Fe_2O_3) was 7½ to 8½ parts by volume to one of albumen.

The conditions to form this soluble iron compound depend as well on the chemical constitution of iron salts as of the organic substance. For iron it is required that the salt be a ferric compound, and that the iron be precipitable by alkali in the state of hydrate, and that the combination be effected while the ferric hydrate is in the nascent state.

Therefore the organic compound must be present before, and, contrary to statements, I never found already precipitated hydrate of iron to dissolve in sugar or any other indifferent substance. As ferric salts, the chloride, sulphate or nitrate may be employed, the phosphate or the alkali combinations of organic acids with iron being excluded.

As a condition for the organic substances, it seems to be required that at least two carbon atoms of the compound should have an exchangeable hydroxyl and one or more in the disposition of carbinol—CH_2OH or

=CHOH, or an exchangeable hydroxyl united directly to a carbon atom in the aromatic group.

This easily explains the phenomena, why the tribasic alcohol glycerin having no carboxyl group in its constitutional formula, forms such a compound, and why all the fatty acids as well as the bibasic oxalic and succinic acids cannot form parties to such compound, while lactic, tartaric or citric acids do. It also explains why ferric benzoate is not soluble in alkali, while the salicylate is. Sugars and carbohydrates must have the larger part of their weight prearranged in alcoholgenetic groups as demonstrated by the facile conversion into the large percentage of alcohol, as they do by fermentation or destruction by heat, and in proteïns the pre-existence of similar groups is evidenced by the large production of bromoform under the destructive action of bromine. According to this view, glycol and glycolic acid, as well as the amido compound glycocoll of even basic character, would form the lowest chemical compound endowed with property spoken of.

Most of the reactions named belong in common to albumen and all the other indifferent bodies mentioned. But with albumen the reaction becomes more complicated through reaction belonging to albumen itself.

In view of the very conflicting statements afloat in text-books, representing the various stages of the evolution of the science as attained to-day, and the many horrible perversions of truth perpetrated and promulgated occasionally in the periodic press about the behavior, the reactions and changes of albumen, and in view of the consequent misconceptions of even professional chemists and manufacturing men who manipulate this article, amply evidenced by the constantly recurring misapplied wrongful statements and corpora delicti furnished by the manufacturing class, it will be advisable to detail such properties of albumen and its changes as come under the conditions and within the scope of this treatise. It is, however, to be understood that the albumen was taken as it is found in nature, without any attempt to purify it and thereby change it to something with which no one else might be familiar.

1. Native egg albumen contains 14–15 per cent. of dry albumen, which in its turn contains some 4½–5 per cent. of ash, which is largely responsible for the condition and reactions of this native albumen. It is slightly alkaline, which causes it to produce small precipitates in neutral solutions of iron salts, its quantity being sufficient to precipitate about ten times its weight of dialyzed iron so completely that neither albumen nor iron is found in the remaining fluid.

2. If a solution of egg albumen be mixed with about ½ per cent. of hydrochloric acid (0.5 per cent. HCl) it is transformed into acid-albumin of syntonine. Heat does not coagulate this solution, but addition of alkali to the neutralization point causes a precipitate of a derivate of albumen insoluble in water, called proteïn.

This proteïn is soluble with ease in either very diluted acids or alkalis, again forming salt-like combinations with them. By heating the undissolved precipitate to 80° C. it becomes insoluble in diluted alkalis, and still more so in diluted acids, and is now identical with the coagulated albumen obtained by boiling native albumen.

3. If caustic alkalies in small amounts be mixed with solutions of albumen, or if coagulated albumen be dissolved by alkali, it is transformed into alkali-albumin. This likewise is not coagulable on boiling, but proteïn, identical with that obtained from acid-albumin, is formed by neutralization by acid. A surplus of acid will bring the precipitate again in solution when acid-albumin is formed. This change from alkali- to acid-albumin may be effected numerous times in the same solution until accumulation of salt interferes.

But if a solution of albumen be mixed with a larger amount of alkali, a precipitate occurs on neutralization which is readily soluble in diluted alkalis, but not in diluted acids.

A precipitate of the same behavior is also obtained if a solution of albumen be mixed with a solution of a heavy metal, when on neutralization a compound of the albumen with the metallic base is formed, which is easily soluble in diluted alkali, but not in diluted acids, unless the metallic salt be largely predominating in the mixture before precipitation is effected. Neither this nor the reaction previously mentioned is explainable if the egg albumen were a homogenous mass. But as in neither of the two cases the entire quantity of albumen is acted upon, this differential reaction may be due to separable constituents of the proteïdal aggregate as found in egg albumen.

4. If very finely coagulated albumen, especially that obtained by heating acidulated solutions of albumen with alkali chloride, be subjected to peptic digestion under favorable conditions, it is dissolved almost at once. This solution contains acid albumin, which differs in no way from that obtained from native albumen directly. If the albumen was less finely divided, if the conditions were less favorable or the solvent power of the pepsin too low for rapid solution, then the liquid may contain a considerable proportion of the more advanced products of digestion before all the albumen had time to be dissolved, due to the simultaneous action of the pepsin on the albumen already dissolved.

5. If the digestive action be continued on the dissolved albumen after a lapse of time, the solution may be found to respond less promptly to the reaction of alkalis or acids. Nitric acid in the cold will produce a precipitate which dissolves again on warming, while before the precipitate obtained would fail to do so. The albumen has now been changed to a derivate called hæmialbumose or propepton. Though less distinctly, it still yields neutralization precipitates, and enters into precipitable combinations with heavy metals, including iron, soluble in alkali. Hæmialbumose, like all the previous forms of albumen, is not diffusible.

6. By prolongation of more or less duration of the same conditions and influences, the final product of peptic digestion is reached; the albumen is peptonized. While all the previous derivates retain more or less of the properties of the original albumen itself, an essential change has been brought about by this final transformation.

Peptone is diffusible, and its reactibility with bases has been so diminished that neither alkalis nor most of the heavy metals, except a few of the higher order, form precipitable compounds. With iron, peptone forms no compounds.

All the derivates of albumen, except peptone, could be precipitated by saturating their acid solutions with sodium chloride or the sulphates of magnesium or sodium. Peptone, thus treated, is not affected, but forms a similar precipitate with the much more soluble ammonium sulphate, which reaction has been accepted as the distinguishing test for its estimation and separation from the rest of the other albumin derivates, and especially also for its separation from the extractive matter left in the final solution.

Peptone is precipitable by alcohol in neutral solution only. If acid or alkaline reaction prevail, no precipitate appears. The same property is also shared by albumen itself, and demonstrates that the affinities for alkalis or acids are not entirely lost in peptone.

Contrary to wide-spread belief, peptone has no color-test of its own. The so-called Biuret reaction, claimed for peptone, belongs to albumen itself, and is only intensified by its passage to peptone.

As an appendix to this exposé, I have yet to mention a peculiarity of albumen, which plays an important role in preparation of albuminate of iron.

If alkali be added to an albuminous precipitate for the purpose of solution, a proportion of alkali insufficient for solution of the whole does not dissolve a proportionate part of it, as might be expected from experience with inorganic bodies. The coagulum swells up, becomes a jelly, and finally dissolves to a perfect solution only when the adequate amount of alkali required for its solution has been added. If alkali be added in the same manner to a precipitate of ferric albuminate, the addition of an insufficient amount may have the disastrous effect of decomposing the compound by extracting albumin; so that, when finally, the full amount of alkali has been added, the compound is so decomposed that albumin only goes into solution, leaving the iron behind as ferric hydrate. Quantities of material, and much labor, may be wasted by ignorance or non-observance of this rule.

Not only albumin, but also the other substances mentioned, are subject more or less to this conformity, each showing an individualism demanding a modification of the general treatment outlined. The existence of such individual characteristics may be illustrated by treating mixtures of sugar or glycerin and ferric chloride with alkali in different modalities.

From a solution of cane sugar and iron no precipitate is obtained, if a surplus of potash be added at once; the solution contains the soluble saccharate of iron and potassium; but if the same amount of potash be added guttatim, as is done if dropped from a burette, ferric hydrate is precipitated, and no soluble compound is formed. The same casualty does not occur with glycerin. With iron, a soluble compound is formed if the solution of iron chloride be dropped into a mixture of alkali and sugar, while the same proceeding forbids itself if tried with glycerin.

A consideration of the foregoing statements will now enable us not only to understand the theory of the formation of albuminate of iron, but also to intelligently judge the formulas and preparations of the market, and enable us also to formulate the existing relations and conditions into such shape as to obtain preparations of any desired constitution and strength, be it to embody a real chemical compound or a compound only in pharmaceutical parlance—a mixture, or concoction.

Before all it must be admitted that there is no peptonate of iron possible as a chemical compound. If the term, albuminate, implies the meaning that albumin acts as the acid radical of the combination, then the same generic appellation applied to peptone should also imply the assumption of the same functions by the peptone. But the formation of a compound with iron, unexpected as it may be, does not take place with peptone. The want of forming a precipitable compound might be explained by its failure to give precipitates of its own on change of reaction, as is the case with all other albumin derivates. But if taken into consideration that we have the same indifference in glycerin also, it must be the want of chemical affinities rather than physical imperfection which causes this indifference of peptone towards iron.

In a mixture of peptone and a ferric salt only hydrate of iron is precipitated on neutralization; no soluble compound is formed. In a mixture or pharmaceutical compound of peptone and oxychloride of iron, whatever there is of acid radical is that supplied by the iron solution beforehand, and to name such a mixture "peptonate of iron" implies a misapplication of title. The two components in relation to each other are co-ordinate, and the title should read "solution of iron and peptone." But if in preparations so named, it is found that they contain albumen and no peptone, the otherwise wrongful appellation takes the character of a misrepresentation.

As an amelioration of such accusation, it might yet have occurred that the sinners against the truth were working under a delusion in regard to what the term "peptone" really means. From numerous allusions in this direction, I have strong reason to believe that a large majority of otherwise well-versed pharmacists and others are still of the opinion that the mere solution of coagulated albumen also includes its transformation into peptone. The error of this conception has been detailed before. If the manufacturers of the condemned articles could be shown that they obtained their products by even a semblance of a digestive process, the crime of deception would be pardonable, but the deception conveyed by the wrongful name would have to be rectified. But there are indications which point to the fact that this is not likely to be the case, and that the deception is knowingly perpetrated.

There is a formula by one of these manufacturers* in which the digestion of albumen, used in the preparation, is not only aimed at but required to be completed, for safeguards are given which exclude the presence of precipitable albumen in the product of digestion. Yet the preparation turned out by the same man does not coincide with the formula given by himself. There are other indications yet which show that the same man was not unconscious of the misrepresentation charged. Side by side there is another formula for albuminate of iron, by the same author, yielding a true chemical compound, in which he orders 3 times the quantity of albumen for the same amount of iron as prescribed in the peptonate formula. Also the reaction of the solution is changed—for cause. It is to be surmised that this man, who is a skillful and shrewd experimenter, was aware of the fact of non-solubility of the peptone mixture in alkali, and that after precipitating it the peptone was wasted by passing into the washings. Why then this third of peptone, which is also wasted, is retained in the formula, and why recourse was taken to an entirely unnecessary chemical process, must be left unanswered with a big interrogation mark.

But the name of peptone is especially captivating and worth while to save it, in this age of advanced knowledge, especially with physicians who know enough of peptone to transmit its own supposed properties to that of peptonate of iron, which, thus endowed, could also be supposed to pass the trying ordeal of the complicated laboratory of digestion, pass the final membranes which separate the digested matter from the faecal mass, to be absorbed, resorbed and assimilated in its totality, hoof and all, untouched, undecomposed.

This would be a dream. For if the peptonate was possible in its present association, with basis in dialyzed iron, it would not diffuse. Dialyzed iron has the name of dialyzed iron because it does *not* dialyze.

But this iron preparation as it is, diverted of its fanciful name, is good enough, and better than many others. Experts of pharmacology found it so; so finds it the public. And an enchanting title is of infinite magnitude, commercially. It helps to sell. It sells a book. The plot needs not be true, but plausible; and the success prompts a host of imitators to imitate.

As a proof of the assertion that these specialties are albuminates and not peptonates, the fact that they yield a precipitate on neutralization with alkali, and re-dissolve again in an excess, should suffice. The fact that the precipitate obtained now from the alkaline solution does not dissolve in dilute acids, strengthens the proof beyond doubt. Then the albumen may be transformed without lifting it out of the original preparation, by subjecting the diluted and alkalized solution to trypsic digestion, when through degradation of the albumen to the more indifferent peptone, the iron is gradually deposited as the albumen loses its grip on it. Parallel trials under additions of alkali in one, and pancreatine in another sample, did not decompose the compound. Pepsin in the original solution did not attack the albumen ; the iron seems to prevent the digestion.

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* E. Dieterich.

Also the public analyst,* who gave his affidavit about another specialty of the same stamp † and which served as the prototype of the former, has been blind enough not to see that the very method he employed in his estimation of the peptone would necessarily exclude its presence. The method was otherwise faulty. In his testimony he came to the conclusion (not sustained by proofs) that he finds the preparation a "true peptonate," which all proves that such indorsements are too complimentary to be of much value, and if the expert ventures on a field where he is not expert —of no value at all.

Throwing the peptonate of iron out of further consideration, there are only albuminates left for further treatment, of which there is only the alternative of the alkaline normal albuminate prepared from normal chloride and that of the alkaline basic albuminate, prepared from ferric oxychloride. Acid solutions, as already mentioned, are mixtures only, and differ not at all from analogous mixtures of chloride or oxychloride of iron with sugar. These are not compounds, although they contain the necessary elements for the formation of the compound, but this has to be brought first into existence by addition of alkali. Alkali absorbs the acid from the iron salt, inducing thereby the copulation of the albumen to the iron, which once free from its former bonds, cannot resist the temptation of grasping the first opportunity offered, in our case albumen, of entering new hymeneal ties, be the prospect of lasting bliss ever so poor.

A mixture differs from a chemical compound in that the ingredients of a mixture may be separated by mechanical means. In mixtures of albumen with ferric chloride, if subjected to dialysis, the iron is soon found in the dialysate, and all of it passes out into the washings, except the small amounts retained by the alkalinity of the albumen and possible contents of basic chloride in the solution of ferric chloride used. From mixtures of albumen and ferric oxychloride, both being colloids, no separation is possible by dialysis, but from mixtures of ferric oxychloride and peptone, it is this latter which passes into the dialysate, while the colloidal iron salt is retained within the separating membrane.

The alkaline solution of normal albuminate is represented by the "Liquor Ferri Albuminati," Drees, who also established the first formula for its preparation. It is a true chemical compound, the soluble alkali compound of the insoluble ferric albuminate.

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* Dr. E. Geissler, Dresden.

† Pizzala's peptonate of iron.

This solution is prone to decompose through atmospheric influences, by attracting from it carbonic acid. It is not, however, as stated, the transformation of its alkali into alkali carbonate, which causes the downfall of the iron (and of the preparation too), for carbonates may be employed as well for preparing the solution; but it is the formation of bicarbonate which is devoid of the faculty to dissolve, or keep the iron in solution.

The preparation, again contrary to printed statements to this effect, spoils the quicker the better they are made pharmaceutically, that is, the less surplus of alkali had been used for its solution.

This is the reason why Drees' or all such preparations reach us since some time in a state of abject perdition; it is probably also the reason why manufacturers took recourse to the above-mentioned acid mixture, whose keeping qualities seem to be of infinite duration. For a time the disturbance of this alkaline solution of ferric albuminate may be rectified by a further addition of alkali, like the saccharate of German pharmacopœial fame, but later on either one is beyond hopes and doctoring.

Of the alkaline iron albuminate the dry preparation cannot be made by the usual evaporation on the water-bath, although it stands boiling without coagulation on evaporation; skin after skin is formed on the surface, like in milk, whose constitution as an alkali-proteïd is not dissimilar. The final residue is insoluble. It may be expected that evaporation in vacuo may produce a similar soluble dry product to that obtained from milk.

Of the alkaline basic albuminate there is no representative amongst the preparations actually made. E. Dieterich gave a formula of which an important simplification may be found in the following lines:

To prepare a solution of normal ferric albuminate, a mixture of proper proportions of solutions of albumen and ferric chloride is neutralized by alkali. Ammonia or the hydrates of fixed alkalis answer as well, the carbonates of the latter being only impracticable for the large evolution of gas, which causes the albuminous solution to foam excessively. Litmus paper as a guide in the precipitation is excluded, as the precipitation is the most perfect when the liquid shows yet slightly acid reaction. But the formation of the precipitate is the best indicator itself to show its completion, for the precipitate being creamy at first, becomes flocculent, and on further addition of alkali congregates in large flocks, which subside from the clear liquid, which, if the proportions were well chosen, contains neither iron nor albumen. At this stage the solution of alkali chlorides drains off rapidly on muslin, while an imperfectly precipitated solution shows the imperfection, may it consist in too little or too much addition of alkali, by refusing to drain off. After washing, the precipitate is dissolved by alkali. To insure solubility, it is better to add the precipitate to the alkali than to reverse the addition.

Solutions of the basic albuminate of iron may be more simply made. Considering that for each molecule of ferric chloride 6 molecules of alkali chloride are formed, the elimination of this large amount of salt is of paramount necessity in the preparation of ferric albuminate from the normal chloride. But with employment of oxychloride, which requires only one-twentieth part of alkali, or less than the normal chloride, for its neutralization, the washing of the precipitate may well be dispensed with, the more as a thorough washing diminishes the chances of its solubility. As the same contingency also rests with the precipitate obtained from normal ferric chloride, the probabilities are that, if the entire amount of these by-products be left in the final solution of basic albuminate, the contamination will be not more, but less, than in the former, where such ablution was imperfectly performed. If precipitation be deemed a superfluous proceeding, the preparation of this form of albuminate narrows down to the mixing of specific quantities of albumen and ferric oxychloride in admissibly diluted solutions, and to dissolve the resulting magma by alkali, as stated before.

To form pharmaceutically perfect preparations from these chemical solutions, they are mixed with 5-8 per cent. of alcohol and properly aromatized. The alcohol is necessary to preserve them.

The proportions in which the components combine may be calculated from data furnished above; practically they are elastic enough for a great divergence, as demonstrated by the various formulas given, provided there be a sufficiency of albumen. I do not intend to submit a specific formula, for it would have to be agreed upon first, and I am of the opinion that the accepted strength of the imported preparation is too low for American usage. Besides, this standard has to be fixed on the content of iron, and not on that of the precipitable albuminate compound, which is too variable to admit of its use.

I think it proper to reserve that for the National Formulary, for the sake of uniformity. This investigation had been begun in its interest, and an expansion of it in the shape of an appendix will be timely, especially after the revision of the U. S. Pharmacopœia has been completed.

The concoctions or acid mixtures of albumin and iron are represented by preparation with both the chloride and the oxychloride of iron.

Of the first order we have a domestic preparation. As stated before, this albuminate of iron is not soluble in conveniently diluted acid, and an acid solution of it would be impracticable from both the chemical and pharmaceutical standpoint.

However prepared, by a process or by no process, it would always represent the same—the original mixture, modified if a process was used.

As a process, dialysis of a mixture of ferric chloride and albumen was recommended, but the result is the entire or almost complete loss of iron, which passes through the membrane as dialysate while the albumin is retained, with such small amounts of iron as correspond to the natural alkalinity of albumen.

It had also been recommended—as the climax of all processes even—to obtain the compound by salting a mixture of albumen and chloride of iron. But the precipitate which is obtained is acid albumen, carrying down with it a portion of iron chloride as a mechanical impurity. The iron may be completely washed out by subsequent washings with an acidulated solution of sodium chloride, so that the albumen is left on the filter free or nearly so of iron.

In no case can a solution of stable proportions be obtained, or its content in iron be foretold, as no chemical compound is formed as long as the acid solution is maintained. In place of any troublesome process, it is as well to mix a meagre portion of tincture of iron to a big portion of albumen, to add glycerin, alcohol, and what else, and to call it what you please—albuminate of iron or yellow throat mixture.

Of the mixtures made with albumen and oxychloride of iron, there are as representatives the imported preparations known by the fanciful appellation of peptonates of iron. They contain respectively 0.42 and 0.46 per cent. of iron, or nearly 0.6 per cent. of hydrated oxide, and equal in strength 10 drops of tincture of iron U. S. P. in a teaspoonful. The precipitate obtained from the preparation by neutralization, best with carbonate of ammonium, consisting of ferric albuminate, weighs 3 times as much as the ferric hydrate, obtained by boiling a sample with strong potash lye, or four times as much as the ferric oxide obtained by calcination of the hydrate of iron previously obtained, or by incineration of either the precipitate of ferric albuminate or the dry residue of the original preparation.

They contain 5 and 8 per cent. of alcohol, said to be in the form of brandy, and one contains 2½ per cent. of sugar. The specific gravity is nearly that of water, and less in one of the specialties. Their acidity is very small; conforming the content of dialyzed iron it corresponds to 2½C.c. of $\frac{n}{K}$ for 100 C.c. On addition of minimal portions of alkali, they readily change their reaction, forming again perfect solutions. They stand boiling without change, as the albumen is in the state of acid albumin, and mix with alcohol for the same reason. Concentrated acids precipitate both the oxychloride of iron and the albumen. Dialysis reveals nothing.

The almost imperceptible acidity and other agreeable features have helped to make these preparations favorites with the public, and the complexity of their deceptively delicate reactions has helped that the deception practised by them has not been discovered before.

These mixtures are most easily imitated by simply mixing solutions of albumen and dialyzed iron; the only trick is that the albumen be first deprived of its alkalinity, else the *real* compound would be formed—which would be a failure.

New York, August, 1890.

Mr. Maisch.—The spirit that Mr. Tsheppe has shown in his researches, and in his experiments for preparing albuminate of iron, is certainly a very commendable one. At the conclusion of his paper is given an excellent direction for making the preparation extemporaneously. This is certainly a most simple method, which will necessarily do away with the complicated processes that have been proposed from time to time. It seems to me that not only this Association, but the profession in general, should be very grateful to Mr. Tsheppe for the work which has led to such practical results. It is stated in the paper that there is little danger of spoiling the preparation as long as the manipulation is exact, and that may be stated incidentally to apply to a good many preparations. In this connection there is one point particularly which strikes me as of some importance, which I think has not been touched upon by Mr. Tsheppe, and I should like to hear his opinion—whether a ferric albuminate possesses such great advantages over other iron preparations that the introduction of such a preparation would be desirable or necessary?

Mr. Tsheppe.—I may answer this query by saying no, because albúminate of iron in the stomach is decomposed; this behavior is alluded to in the paper. The preparation has no advantage over dialyzed iron, though the latter is not a very good preparation.

Mr. Remington here made a motion that the action of the Section regarding the reading of Mr. Eccles' papers be reconsidered, and that the papers be read next, since a number of delegates were in attendance specially to hear it. The motion was seconded, and by a rising vote carried.

The following two papers were then read by Mr. Eccles.

WHAT IS PEPSIN?

BY R. G. ECCLES, M. D.

There are probably but few drugs of the Pharmacopœia whose compositions are of such an uncertain character as pepsin. Its complexity of structure has always been deemed somewhat marvellous, and the investigations about to be laid before you confirm such an opinion. For fifty years or more men have sought to isolate it in a pure state, but in vain. Like an uncanny ghost, it escapes the clutches of its would-be imprisoners. Its work too is of such a character that it partakes more of the nature of fairyland than of a world that usually seems governed totally by mechanical rigidity of law. Its function appears to defy the conservation of forces, and belie the old Latin saying, *Ex nihilo nihil fit.* It cannot forever defy the prying eyes of chemists, and must some day give up its secret to humanity. The experiments about to be reported let in a flood of light in some directions, and may lead the way to a final reading of the riddle. Much of the work will doubtless need correcting, and the conclusions readjusting, as a confession of over-hastiness in what has been done belongs here as a prelude to the report. Although some of the experiments extend over a period of two years, most of them have been crowded into three months, and a large number were begun on August 1st of the present year, and finished the day the writer left home to attend this meeting.

To perfect the task which this paper sketches would have required a man's undivided attention for at least two years. Every point should have been fortified by successive repetitions, while exceptions and failures were noted and recorded as corrections. In the present instance other and pressing duties forbade anything of the kind. A few dominant ideas inspired what was done, and each experiment was a question put to nature that affirmative or negative answers might be had. The trend of all was toward the discovery of what pepsin is. Is it one single ferment or a combination of ferments? Can it be isolated and studied in its purity? What are the substances that contaminate it, and do they differ in different makes? How does it differ from its different associated substances? How can manufacturers give us a purer product? What proportions of the pepsins of commerce are pure ferment, and how much extraneous matter? How can we accurately determine the proteolitic power of the different brands? Can a test be devised simple enough for the average pharmacist to apply, and without consuming too much of his precious time? Is it the pepsin or something else that dissolves albumen? What substances will destroy the power of pepsin? What per cent. of the various makes is soluble in a number of different solvents? What effect has age on solutions of pepsin? What chemical tests have we to distinguish pepsin from albumen and peptones? What improvements have there been in the quality of pepsin since the report of this writer to this Association at Providence? Can an assay method be discovered suitable for the next revision of the Pharmacopœia?

These are a few of the many questions awaiting immediate reply. The answers about to be presented fall very far short of satisfactory, but they seem to bring us a little nearer the true ones than we have been before. That answers to some of them are needed very badly can be seen by simply glancing over recent pharmaceutical literature and observing the many contradictory reports from various experts. The same brand of pepsin in ten different hands gives as many different results as there are men. One declares that one part of the pepsin will dissolve two thousand parts of albumen; another that it will only dissolve five hundred or a thousand. Many of these men forget that time is an element in the test, and that a multitude of conditions require identity of place and order to get uniformity with a common make or just comparison between rival makes. Until the same man discovers that he can take one brand of pepsin and get it to digest exactly the same proportion of albumen in the same time for six or more trials, he should not pretend to compare the various brands of the market by the current method of testing. When the fact is better known and fully appreciated that coagulated albumen needs no pepsin to dissolve it, but that it will dissolve in 0.2 per cent. hydrochloric acid alone, then our skepticism of the value of the method now in vogue will be considerably increased. The writer can take one part of sugar, bread, gravel or any other inoperative body, and 2000 parts of albumen, and with dilute acid enough, can appear to digest it in 6 hours. It will certainly all go into solution. What confidence then can be put in any tests that rely solely on the disappearance of the albumen? Yet this is what many experts call pepsin-testing, and the funniest part of the whole matter is that they believe in it themselves. In this way powdered brickdust or glass can be truthfully advertised as digesting 1000 parts, 1500 parts, or 2000 parts, as the case may be, of coagulated albumen in six hours. Dissolving albumen is a rough way of estimating pepsin at the best. When the amount of dilute acid is not more than nine times the quantity of the albumen used, and the time is kept within four or five hours, it approximates true results. Just in proportion as the quantity of the dilute acid increases, so is the uncertainty of the result, and the bigger are the figures of what can be dissolved. This delusion is also heightened by finely-ground albumen. The finer it is ground the quicker it disappears, whatever the character of the pepsin used, and even in the absence of all pepsins.

The product of solution is syntonin or acid albumen, and it is the writer's conviction, after a careful study and many experiments, that the pepsin only indirectly has anything to do with the production of this substance. The acid he believes to be the sole direct agent in the change always. The pepsin changes the syntonin first into parapeptone, and then into peptone. In doing so it removes the syntonin from the way of the acid, so that it can go on dissolving the remaining albumen. The syntonin acts on the albumen as an oxide does on a metal to protect it from further oxidation. The pepsin is a solvent to the "oxide," and so removes it to allow of further "oxidation." The test, therefore, on which we have so long relied for the value of our ferment, probably only acts at second hand, and is subject to all the complications and uncertainties of indirect activity. Not to know this, is to be constantly liable to give unfair and false results. Meissner, who named parapeptone, believed that it and peptone were two substances produced by a splitting up of albumen through the action of pepsin, and that the parapeptone had to enter the duodenum to complete its digestion. He thought that pepsin could not alter the nature of parapeptone. That this is an error has repeatedly been proven during these investigations. There is no doubt about the conversion by continuous digestion of all the parapeptone and syntonin in a solution into peptone, when time enough is given and the pepsin is all right.

The presence of parapeptone at any stage of the work is easily ascertained by taking a small quantity of the solution and neutralizing with carbonate of sodium. The parapeptone is then immediately precipitated, while the peptone remains in solution. A very active pepsin will render this unprecipitable in a few hours after the whole of the albumen has been dissolved. A small amount can always be found as long as there is any undigested syntonin. The presence of this last proteid is determined by using strong nitric acid. Until the last of it has disappeared, the albumen is not digested. Hereafter the calculation of the digestive power of a pepsin must be based on its own work, and not, as heretofore, on the work of the acid. Merely because the albumen has become invisible, we cannot assert that any part of it has been digested. Here is a bottle filled with acid albumen solution, and yet not one particle of peptone can be found in it. Between this state of albumen invisibility with no digestion and albumen invisibility with complete digestion, there are all degrees. Here is another bottle containing a solution of pure peptone. Every bit of the albumen is digested in this one. With the first you will observe that the biuret test gives a purplish blue color and with the last a bright red. When strong nitric acid is dropped into the first you can observe the immediate appearance of coagulated albumen. When the same kind of acid is dropped into the second, no such coagulation occurs, but on standing it becomes yellow and shades to orange according to the quantity of peptone present and the previous color of the solution. Until but the faintest appearance of milkiness, or none at all, develops from nitric acid, we should not deem any sample of albumen digested.

In each of the following ten tabulated experiments, ten grams of finely ground albumen with five centigrams of various makes of pepsin were made up to 100 cubic centimeters, with 0.2 per cent. muriatic acid, placed in suitable bottles, kept in a water-bath at a temperature of 100° F. and frequently agitated. After the fourth hour a small amount was taken from each hourly, and tested for syntonin. The lowest claim of digestive power for any sample of pepsin used was one part to one thousand. These trials were with one part to two hundred of albumen, or just one-fifth of that amount. The highest claim was one part in two thousand or ten times that of our tests. With solution of the albumen as a guide, there is no doubt of their ability to do all their makers claim for them. It is evident, however, from what has already been said, that the old method is too unreliable for us to longer depend upon it, so that some newer and better one should be found. The results, as given on page 127, are put in order of superiority for easy comparison.

Where they are given as being dissolved at a certain hour, it is to be understood that some of them were dissolved at intermediate times between the hours. Number six, for instance, was dissolved at 6.20 p. m., instead of 7 p. m., as tabulated, and number 4 at 5.15. The final clearing up in none of them reached perfect transparency, but the contrast between the place where the acid came in contact with the solution and that out of reach of the acid was the guide.

It may be supposed by some that the pepsins with which we have here been dealing were inferior brands not generally kept by pharmacists. On the contrary, most of them were select goods, procured directly from the makers themselves. No risks were taken of getting old or inferior

COMPARATIVE PEPSIN TESTS.

	SOLUTION TIME.			NITRIC ACID TEST.				
4 P. M.	5 P. M.	6 P. M.	7 P. M.	8 P. M.	9 P. M.	10 P. M.	11 P. M.	12 M.
1	Dissolved.	. . . . .	. . . . .	Milky.	Slightly Milky.	Clear.	. . . .	. . . .
2	Dissolved.	. . . . .	. . . . .	Quite Milky.	Milky.	Nearly Clear.	Clear.	. . . .
3	Dissolved.	. . . . .	. . . . .	" "	"	Slightly Milky.	Almost Clear.	Clear.
4	. . . . .	Dissolved.	. . . . .	Dense Coagulation.	Very Milky.	Milky.	Slightly Milky.	A Faint Cloud.
5	. . . . .	Dissolved.	. . . . .	" "	Dense Coagulation.	Very Milky.	Milky.	Slightly Milky.
6	. . . . .	. . . . .	Dissolved.	" "	" "	Dense Coagulation.	Very Milky.	Milky.
7	. . . . .	. . . . .	Dissolved.	" "	" "	" "	Dense Coagulation.	Very Milky.
8	. . . . .	. . . . .	Dissolved.	" "	" "	" "	" "	Dense Coagulation.
9	. . . . .	. . . . .	Dissolved.	" "	" "	" "	" "	" "
10	. . . . .	. . . . .	. . . . .	Dense Coagulation, but Dissolved.	" "	" "	" "	" "

stock that some jobber had laid away till forgotten in some corner of his store, and then happened to discover it just as my order came in. The makers or their agents were visited in person, and asked to supply the very best preparations they had on the market, the statement being made to each that it was designed for experimental purposes. This course not only guaranteed a supply of fresh goods of the most approved quality, but it also lessened the cost of the materials necessary for the investigation.

The following five houses very kindly supplied what pepsin was needed, and refused to accept pay for the same : Parke, Davis & Co., E. Merck, Fairchild Brothers & Foster, New York and Chicago Chemical Co., and the Carl L. Jensen Co. In the bulk of the work done, these brands were used to the exclusion of all others. In the extension of special investigations in the matter of pepsin tests, five other brands were used, but as only small amounts were needed, they were taken from the general stock of a retail drug store.

It is evident from the results given that the digestive power of all kinds of pepsin is only about one-eighth to one-tenth of that which it has received credit for. Who knows but this may account for a large number of the failures of patients to receive benefit from the drug ? When a teaspoonful of a mixture representing half a grain to a grain is administered three times a day, even though there happens to be nothing incompatible given at the same time, what great benefit can be hoped for to the patient? Half a grain of the very best in the market can only complete the digestion of one hundred grains of albumen or fibrine in six hours. To digest a pound of beefsteak at this rate would require over two and one-half drams. For various reasons that cannot be discussed here, less than this would really do the work in the stomach, but not enough less to seriously invalidate our reasoning. From fifteen grains to half a dram should, however, be the minimum dose for an adult. A marked tendency toward increase of dose has always been observable since the time physicians began with our old-fashioned saccharated pepsin. This at one time was given in small doses, but little by little prescribers became more bold as they learned that it did not digest off the lining membrane of the stomach, and now they administer twenty or thirty times as much. Let them increase the quantity still more and dyspeptic patients will bless them for the same, while the manufacturers of the drug will discover that they have all along been diminishing the sales of their own goods by a too high figure of the power.

Ever since the Providence meeting, a bitter feud has been going on between rival manufacturers as to the superiority of quality in their goods. It began by the publication as advertisements of parts of this writer's papers on "A Study of Pepsin," and "A Study of Peptonization," by those who believed that work favored them. In circulars and magazine advertisements these excerpts appeared without my knowledge or consent, except in one instance, where the privilege of quoting was asked and granted some six months after the meeting. The results of this so-called "pepsin war" have been of very great value to the public. The rivalry has increased the proteolytic power of most brands in a remarkable degree, without adding to their cost to the public. Some which were at or near the bottom of the scale then, are now among those at the very top. At that time a distinction was made between peptone pepsins and other kinds. While this distinction still holds true in one way, it is totally misleading in another. That there are still pepsins easily dissolved in water and quite deliquescent, while there are others that are difficult of solution and still remain dry in the dampest of weather, is quite true. When we attribute this difference solely to the presence of peptone in one brand and its absence in another, we are entirely mistaken. Here are solutions of seven different brands of pepsin, only two of which are hygroscopic and freely soluble as found in the market. Taking a small quantity of each in a test tube and applying the biuret test, you observe that every one of them contains peptone, as evidenced by the brilliant color they have taken on. Two of these are the most insoluble in the market.

All pepsins, so far as has yet been discovered, are peptone pepsins, and only differ in this respect from each other in degree. Some contain much peptone, while all contain some. Furthermore, the writer has taken the two articles that are most difficult to dissolve, dissolved from them everything that was soluble in 0.2 per cent. hydrochloric acid, filtered them to clearness (a most difficult task), and evaporated the solution to dryness at a low temperature. After successive washings of the insoluble mucine, it was found, on repeated trials, to be totally inert as a digesting agent. On trying the solution and its dried-up residue, they were found to contain the ferment in increased power. But this dried residue was no longer non-hygroscopic. It resisted moisture a little better than the well-known hygroscopic brands, however. On dissolving a second time, but in distilled water, more mucine was thrown down that trial proved to be free from proteolytic power. When the solution was re-dried at a low temperature the extractive was proven to contain all the digestive power. On standing in a moist atmosphere it was found to become soft and sticky, and have every appearance of a so-called peptone pepsin, but of unusually high quality. From this we learn that it is very probable that future improvements in pepsins will make them resemble the very grades which in my earlier communication were all found to be but little better than the saccharated. No matter by what process a pepsin is extracted from the mucous membrane of a pig's stomach, purification is going to give us it as a product that no one can tell from an ordinary peptone pepsin. In fact that is what it really will be, until we discover how to remove peptone as well as we can mucine.

For the purpose of laying the foundation for the complete analysis of various brands of pepsin, twenty-seven different solvents were tried on five brands, making in all a total of one hundred and thirty-five trials of solvent power. The weighing, labeling, measuring and caring for all of these was no child's task. Into every bottle was placed fifty cubic centimeters of the solvent. If the most soluble pepsin of the lot dissolved freely, four grams of each was used; if decided insolubility of all was manifest, only two grams were used. Four weeks elapsed before the determinations were begun. Sometimes, as in the case of fusel oil, the undissolved pepsin was weighed after washing with strong alcohol; but, in most instances, an aliquot part of the total solvent was evaporated to dryness and weighed. With caustic soda the result was corrected for amount of soda after combustion, and with all that follow it a guess was made since the general appearance led me to believe that they were all alike, or so nearly that any difference there might be was unimportant. With glycerin, too, a guess was made, because of the difficulty and cost of a carefully performed determination. (See page 131).

Here we see that pepsins of all brands are totally insoluble in absolute alcohol, stronger ether, chloroform, benzin, and turpentine; very sparingly soluble in strong alcohol, methyl alcohol, amyl alcohol, ether and paraldehyde; and quite soluble in dilute ethyl alcohol, dilute methyl alcohol, glycerin, distilled water, dilute muriatic acid, aqua ammoniæ, as well as caustic potash and caustic soda solutions. The solubility in weak ether and alcohols of ordinary strength may be due to the small amount of water present. This idea is enforced by the appearance of the pepsin itself, and by the fact that absolute alcohol has no solvent power upon them other than that of taking up traces of coloring matter. It was hoped that some one of these would show a tendency to take up the ferment itself to the exclusion of all extraneous substances, but we were doomed to disappointment. All the solutions after evaporating at a low temperature were tested as to proteolytic power, but none of them showed any very marked increase in this respect. They were also tested as to precipitating power by such substances as they were found to be insoluble in, but not one of the precipitates showed increased digestive ability, and that of methyl alcohol was seriously impaired. It was quite interesting to note the physical appearance of the undissolved parts, and also of the solutions themselves. The next list shows this, designating the solution as number one and the undissolved part of the pepsin as number two. (See page 132).

SOLUBILITIES.

Name of Solvent.	Parke, Davis and Co.	Jensen.	Fairchild Bros. & Foster.	Merck, 1–2000.	Ford.
Dilute Alcohol (½).	80 per cent. dissolved.	65 per cent. dissolved.	50 per cent. dissolved.	60 per cent. dissolved.	40 per cent. dissolved.
Strong Alcohol.	Less than 1 per cent.	Less than 1 per cent.	Less than 1 per cent.	Less than 1 per cent.	Less than 1 per cent.
Absolute Alcohol.	Scarcely any.	Scarcely any.	Scarcely any.	Coloring Matter.	Scarcely any.
Dilute Methyl Alcohol (½).	About 80 per cent. dissolved.	70 per cent. dissolved.	45 per cent. dissolved.	60 per cent. dissolved.	28 per cent. dissolved.
Methyl Alcohol.	About 2 per cent.	About 2 per cent.	About 2 per cent.	About 2 per cent.	About 2 per cent.
Amyl Alcohol (Fusel Oil).	" "	" "	" "	" "	" "
Ether.	Less than 1 per cent.	Less than 1 per cent.	Less than 1 per cent.	Less than 1 per cent.	Less than 1 per cent.
Stronger Ether.	Insoluble.	Insoluble.	Insoluble.	Insoluble.	Insoluble.
Paraldehyde.	"	About 1 per cent.	About 1 per cent.	About 1 per cent.	Less than 1 per cent.
Chloroform.	"	Insoluble.	Insoluble.	Insoluble.	Insoluble.
Benzin.	"	"	"	"	"
Turpentine.	"	"	"	"	"
Dilute Glycerin (½).	98 per cent. dissolved.	65 per cent. dissolved.	50 per cent. dissolved.	75 per cent. dissolved.	40 per cent. dissolved.
Glycerin.	Probably 50 per cent. dissolved.	Probably 50 per cent. dissolved.	Probably 35 per cent. dissolved.	Probably 50 per cent. dissolved.	Probably 25 per cent. dissolved.
Distilled Water.	100 per cent. dissolved.	98 per cent. dissolved.	80 per cent. dissolved.	90 per cent. dissolved.	58 per cent. dissolved.
0.2 per cent. Muriatic Acid.	100 " "	98 " "	80 " "	90 " "	58 " "
1 per cent. Muriatic Acid.	100 " "	98 " "	80 " "	90 " "	58 " "
10 per cent. Muriatic Acid.	100 " "	98 " "	80 " "	90 " "	58 " "
0.5 per cent. Ammonia Water.	95 " "	92 " "	73 " "	74 " "	60 " "
1 per cent. Ammonia Water.	95 " "	90 " "	73 " "	90 " "	60 " "
10 per cent. Ammonia Water.	95 " "	85 " "	70 " "	90 " "	60 " "
0.5 per cent. Caustic Potash.	92 " "	85 " "	73 " "	90 " "	60 " "
1 per cent. Caustic Potash.	All that follow seemed to be like 0.5 per cent. caustic potash, and no effort was made to determine them.				
5 per cent. Caustic Potash.					
0.5–3.6 per cent. Caustic Soda.					

PHYSICAL APPEARANCE.

Name of Solvent.	Parke, Davis & Co.	Jensen.	Fairchild Bros. & Foster.	Merck, 1–2000.	Ford.
Dilute Alcohol (½).	1 Transparent. 2 Thin jelly.	1 Transparent. 2 Jelly.	1 Transparent. 2 In scales.	1 Translucent. 2 Granular.	1 Transparent. 2 In scales.
Alcohol.	1 Transparent. 2 Coherent.	1 Transparent. 2 Coherent.	1 Transparent. 2 In scales.	1 Transparent. 2 In scales.	1 Transparent. 2 In scales.
Absolute Alcohol.	Unchanged.	Unchanged.	Unchanged.	Unchanged.	Unchanged.
Dilute Methyl Alcohol (½).	1 Transparent. 2 Jelly.	1 Transparent. 2 Thin jelly.	1 Almost opaque. 2 Granular.	1 Almost opaque. 2 Granular.	1 Opalescent. 2 In scales.
Methyl (Wood) Alcohol.	1 Transparent. 2 Coherent.	1 Transparent. 2 Coherent.	1 Transparent. 2 Scaly.	1 Transparent. 2 Scaly.	1 Transparent. 2 Scaly.
Amyl (Fusel) Alcohol.	1 Transparent. 2 Coherent.	1 Transparent. 2 Coherent.	1 Transparent. 2 Scaly.	1 Transparent. 2 Scaly.	1 Transparent. 2 Scaly.
Ether.	1 Milky. 2 Little change.	1 Transp'r'nt. 2 Little change	1 Transparent. 2 Scaly.	1 Transparent. 2 Granular.	1 Transparent. 2 Scaly.
Stronger Ether.	Unchanged.	Unchanged.	Unchanged.	Unchanged.	Unchanged.
Paraldehyde.	"	1 Transparent. 2 Coherent.	1 Transparent. 2 Scaly.	1 Transparent. 2 Scaly.	1 Transparent. 2 Scaly.
Chloroform.	"	Unchanged.	Unchanged.	Unchanged.	Unchanged.
Benzin.	"	"	"	1 Unchanged. 2 Darkened.	"
Turpentine.	"	"	"	Unchanged.	"
Dilute Glycerin (½).	1 Clear. 2 Floating jelly.	1 Transparent. 2 Thin jelly.	1 Translucent. 2 Mushy.	1 Translucent. 2 Mushy.	1 Transparent. 2 Swollen scales.
Glycerin.	1 Clear. 2 Gummy.	1 Milky. 2 Gummy.	1 Translucent. 2 Scaly.	1 Translucent. 2 Compact.	1 Transparent. 2 Scaly.
Distilled Water.	1 Clear. 2 ———.	1 Clear. 2 Powdery.	1 " 2 Mushy.	1 Clear. 2 Powdery.	1 Milky. 2 Powdery.
0.2 per cent. Muriatic Acid.	1 Milky. 2 ———.	1 Milky. 2 Powdery.	1 Nearly opaque. 2 Mushy.	1 Translucent. 2 Mushy.	1 Clear. 2 Powdery.
1 per cent. Muriatic Acid.	1 Clear. 2 ———.	1 Clear. 2 Powdery.	All mushy.	1 Clear. 2 Powdery.	All mushy.
10 per cent. Muriatic Acid.	1 Translucent. 2 ———.	1 Translucent. 2 Powdery.	1 Opaque. 2 Mushy.	1 Translucent. 2 Mushy.	1 Translucent. 2 Powdery.
0.5 per c'nt. Ammonia Water.	1 Milky. 2. Powdery.	1 Milky. 2 Powdery.	1 Translucent. 2 Powdery.	1 Opaque. 2 Mushy.	1 Milky. 2 Powdery.
1 per cent. Ammonia Water.	1 Clear. 2. Powdery.	1 Clear. 2 Jelly.	1 Opaque. 2 Mushy.	1 Transparent. 2 Jelly.	1 Clear. 2 Mushy.
10 per cent. Ammonia Water.	1 Clear. 2. Powdery.	1 Clear. 2 Jelly.	1 Clear. 2 Mushy.	1 Clear. 2 Jelly.	1 Clear. 2 Mushy.
0.5 per cent. Caustic Potash.	1 Milky. 2. Powdery.	1 Translucent. 2 Powdery.	1 Opaque. 2 Mushy.	1 Translucent. 2 Mushy.	1 Translucent. 2 Mushy.
1 per cent. Caustic Potash.	1 Milky. 2 Jelly.	1 Milky. 2 Jelly.	1 Translucent. 2 Mushy.	1 Translucent. 2 Mushy.	1 Translucent. 2 Mushy.
5 per cent. Caustic Potash.	1 Clear. 2 Jelly.	1 Clear. 2 Jelly.	1 Clear. 2 Jelly.	1 Clear. 2 Jelly.	1 Clear. 2 Mushy.
0.5 per cent. Caustic Soda.	1 Milky. 2 Powdery.	1 Clear. 2 Powdery.	1 Translucent. 2 Mushy.	1 Translucent. 2 Mushy.	1 Milky. 2 Mushy.
1 per cent. Caustic Soda.	1 Milky. 2 Powdery.	1 Milky. 2 Jelly.	1 Milky. 2 Mushy.	1 Clear. 2 Mushy.	All mushy.
3.6 per cent. Caustic Soda.	1 Clear. 2 Jelly.	1 Clear. 2 Jelly.	1 Translucent. 2 Jelly.	1 Clear. 2 Jelly.	1 Clear. 2 Jelly.

In liquids that did not dissolve the pepsin its appearance remained practically unaltered, while the liquid itself kept quite transparent. So different were the results on different pepsins by the same solvent that no general rule could be adduced. Strong caustic alkalies as a rule changed the total mass of undissolved material into something like gelatine. In weak acids and alkalies the development of fungi of various kinds led to very great diversity. A large number of these, as well as some of those in distilled water, developed gases that breathed of anything but the fragrant odors of Ceylon. The fermentation of the average ferment very materially outrivals sulphuretted hydrogen in odor. A couple of weeks of warm weather sent corks flying with the report of a pistol, and in three instances carried fragments of the bottles themselves along. Three bottles of the total number refused either to dissolve or settle remaining to the last a mass of muddy mush. Two of them were 1 per cent. muriatic acid and one of them 1 per cent. caustic soda. The three represented only two makes of pepsin, both of which contained a large amount of mucine. A large number, although not so bad as the three cited, were inclined in that direction, and did not become perfectly clear. They ranged all the way from mere opalescence to perfect opacity. The differences in color imparted to the solvents and taken on by the undissolved pepsins, were an interesting study. (See page 134.)

As a guide to the various constituents of the different kinds of pepsin, these color-changes are invaluable. The story they tell can only be fully unravelled by one thoroughly acquainted with the chemistry of the proteids and kindred compounds. The changes to black and the various shades of olive green were all deemed due to fungoid fermentation, because decomposition had set in wherever they appeared. In a number of them penicillium glaucum in full fruit appeared upon the surface, while the mycelia penetrated the mass in interwoven threads of silvery lustre. The colors in the rest shaded all the way from the palest of straw to the darkest of dark amber, or in some instances to dark brown and deep, almost black, wine red. The solutions in which the pepsin was totally insoluble remained, of course, uncolored. Here, as in the other tables, number one stands for the solution, and number two for the undissolved part. Ten per cent. muriatic acid gave with every brand an exceedingly dark but transparent wine-red color. Amyl alcohol gave a beautifully transparent dark amber with three, and a very handsome light amber with two of the samples. Paraldehyde changed the undissolved pepsin in one to an orange yellow, and in two others to a dark brown. Benzin left four of the specimens unchanged, but turned the pepsin a dark brown in one. The next list shows the effects of the solvents on the digesting power of the ferment. Where there was no solution the solid pepsin was tried. Where solution occurred the liquid was evaporated at a low temperature to dryness before testing. (See page 135.)

COLOR CHANGES.

Name of Solvent.	Parke, Davis & Co.	Jensen.	Fairchild Bros. & Foster.	Merck 1-2000.	Ford.
Dilute Alcohol (½).	1 Yellow. 2 Whitish.	1 Amber. 2 Slate.	1 L. amber. 2 Unch'd.	1 L. amber. 2 Drab.	1 L. yellow. 2 Unch'd.
Alcohol.	1 Yellow. 2 White.	1 Yellow. 2 Whitish.	1 Amber. 2 Unch'd.	1 Amber. 2 Unch'd.	1 L. yellow. 2 Unch'd.
Absolute Alcohol.	1 Colorless. 2 Usual.	1 Colorless. 2 Usual.	1 Colorless. 2 Unch'd.	1 Yellow. 2 Unch'd.	1 L. yellow. 2 Unch'd.
Dilute Methyl Alcohol (½).	1 Amber. 2 White.	1 Dark amber. 2 Gray.	1 L. yellow. 2 Whitish.	1 Brownish yellow. 2 B. yellow.	1 Opalescent yellow. 2 Unch'd.
Methyl (Wood) Alcohol.	1 Yellow. 2 White.	1 Amber. 2 Whitish.	1 Amber. 2 L. brown.	1 D. amber. 2 L. brown.	1 Yellow. 2 Whitish.
Amyl (Fusel) Alcohol.	1 Amber. 2 L. yellow.	1 D. amber. 2 Brown.	1 D. amber. 2 L. brown.	1 D. Amber. 2 Brown.	1 Amber. 2 L. brown.
Ether.	1 Colorless. 2 Tinge of Yellow.	1 Nearly colorless. 2 Yellowish.	1 Nearly colorless. 2 L. brown.	1 L. yellow. 2 L. brown.	1 L. yellow. 2 L. brown.
Stronger Ether.	Unchanged.	Unchanged.	Unchanged.	Unchanged.	Unchanged.
Paraldehyde.	1 Colorless. 2 Unch'd.	1 L. amber. 2 Yellow.	1 Yellow. 2 D. brown.	1 yellow. 2 D. brown.	1 Colorless. 2 Unch'd.
Chloroform.	Unchanged.	Unchanged.	Unchanged.	Unchanged.	Unchanged.
Benzin.	"	"	"	1 colorless. 2 D. brown.	"
Turpentine.	"	"	"	Unchanged.	"
Dilute Glycerin (½).	1 Amber. 2 White.	1 Yellow. 2 White.	1 D. amber. 2 Brown.	1 Brown. 2 Brown.	1 yellow. 2 Straw.
Glycerin.	1 Yellow. 2 Yellow.	1 Yellow. 2 Amber.	1 Amber. 2 Brown.	1 Amber. 2 Brown.	1 Colorless. 2 Straw.
Distilled Water.	1 Yellow. 2 ——	1 Yellow. 2 White.	1 Olive. 2 Blue black.	1 D. amber. 2 Black.	1 yellow. 2 Straw.
0.2 per cent. Muriatic Acid.	1 Yellow. 2 ——	1 Yellow. 2 White.	1 O. brown. 2 B. black.	1 Ol. brown. 2 Black.	1 yellow. 2 Straw.
1 per cent. Muriatic Acid.	1 L. amber. 2 ——	1 L. amber. 2 White.	Br. mush throughout.	1 D. amber. 2 Brown.	Straw colored mush.
10 per cent. Muriatic Acid.	1 Almost black. 2 ——	1 Alm't black. 2 White.	1 Alm't black. 2 Brown.	1 Alm't black. 2 Brown.	1 Alm't black. 2 Brown.
0.5 per cent. Ammonia Water.	1 L. yellow. 2 Black.	1 L. yellow. 2 Black.	1 D. amber. 2 Black.	1 D. olive. 2 Black.	1 Amber. 2 Straw.
1 per cent Ammonia Water.	1 L. amber. 2 White.	1 L. amber. 2 L. brown.	1 D. olive. 2 Black.	1 D. wine. 2 D. brown.	1 Amber. 2 Straw.
10 per cent. Ammonia Water.	1 Amber. 2 White.	1 D. amber. 2 Gray.	1 D. amber. 2 Olive.	1 D. wine. 2 Black.	1 Yellow. 2 Straw.
0.5 per cent. Caustic Potash.	1 L. olive. 2 Black.	1 Olive. 2 Black.	1 Olive. 2 Olive.	1 D. brown. 2 Black.	1 Olive. 2 Drab.
1 per cent. Caustic Potash.	1 L. yellow. 2 Drab.	1 L. yellow. 2 White.	1 D. brown. 2 D. brown.	1 D. brown. 2 Black.	1 Yellow. 2 Straw.
5 per cent. Caustic Potash.	1 D. amber. 2 Black.	1 Amber. 2 Black.	1 D. wine. 2 Brown.	1 D. amber. 2 Black.	1 D. amber. 2 L. brown.
0.5 per cent. Caustic Soda.	1 L. yellow. 2 Drab.	1 Amber. 2 White.	1 Amber. 2 Olive.	1 Brown. 2 Black.	1 L. Yellow. 2 White.
1 per cent. Caustic Soda.	1 Ol. green. 2 Drab.	1 Amber. 2 Whitish.	1 D. amber. 2 Olive.	1 D. wine. 2 Brown.	Mushy light brown.
3.6 per cent. Caustic Soda.	1 L. amber. 2 Drab.	1 Yellow. 2 Drab.	1 L. brown. 2 Brown.	1 Amber. 2 Brown.	1 Amber. 2 Drab.

INFLUENCE OF SOLVENT ON PROTEOLYTIC QUALITY.

Name of Solvent.	Parke, Davis & Co.	Jensen.	Fairchild Bros. & Foster.	Merck, 1-2000.	Ford.
Dilute Alcohol (½).	Impaired markedly.	Destroyed.	Destroyed.	Destroyed.	Destroyed.
Alcohol.	Slightly impaired.	Slightly impaired.	Slightly impaired.	Slightly impaired.	Slightly impaired.
Absolute Alcohol.	Unimpaired.	Unimpaired.	Unimpaired.	Unimpaired.	Unimpaired.
Dilute Methyl Alcohol (½).	Nearly destroyed.	Destroyed.	Destroyed.	Destroyed.	Destroyed.
Methyl (Wood) Alcohol.	Destroyed.	"	"	Nearly destroyed.	Nearly destroyed.
Amyl (Fusel) Alcohol.	Unimpaired.	Unimpaired.	Unimpaired.	Unimpaired.	Unimpaired.
Ether.	Impaired.	Impaired.	Impaired.	Destroyed.	Impaired.
Stronger Ether.	Unimpaired.	Unimpaired.	Unimpaired.	Unimpaired.	Unimpaired.
Paraldehyde.	"	Slightly impaired.	Slightly impaired.	Slightly impaired.	"
Chloroform.	Nearly destroyed.	Destroyed.	Destroyed.	Destroyed.	Nearly destroyed.
Benzin.	Unimpaired.	Unimpaired.	Unimpaired.	Unimpaired.	Unimpaired.
Turpentine.	"	"	"	"	"
Dilute Glycerin (½).	"	"	"	"	"
Glycerin.	"	"	"	"	"
Distilled Water.	Scarcely impaired.	Nearly destroyed.	Destroyed.	Scarcely impaired.	Scarcely impaired.
0.2 per cent. Muriatic Acid.	" "	Impaired.	Impaired.	" "	" "
1 per cent. Muriatic Acid.	" "	Scarcely impaired.	Scarcely impaired.	" "	" "
10 per cent. Muriatic Acid.	Impaired.	Nearly destroyed.	Nearly destroyed.	Nearly destroyed.	Nearly destroyed.
0.5 per cent. Ammonia Water.	Destroyed.	Destroyed.	Destroyed.	Destroyed.	Destroyed.
1 per cent. Ammonia Water.	"	"	"	"	"
10 per cent. Ammonia Water.	"	"	"	"	"
0.5 per cent. Caustic Potash.	"	"	"	"	"
1 per cent. Caustic Potash.	"	"	"	"	"
5 per cent. Caustic Potash.	"	"	"	"	"
0.5 per cent. Caustic Soda.	"	"	"	"	"
1 per cent. Caustic Soda.	"	"	"	"	"
3.6 per cent. Caustic Soda.	"	"	"	"	"

From this we see that while absolute alcohol does not injure pepsin and commercial alcohol does so slightly, dilute alcohol completely destroys it. One sample of the five showed slight proteolytic power at the end of four weeks, but was probably rapidly running toward complete destruction. Methyl alcohol appears to be more destructive than ethyl alcohol when strong. Amyl alcohol, stronger ether, benzin, turpentine and glycerin had no ill effects upon the ferment. Chloroform, ammonia, potash and soda, were all very destructive. Distilled water and 0.2 per cent. muriatic acid showed a somewhat singular state of affairs, in that with some brands impairment and even destruction occurred, while with others no apparent injury could be detected. This was attributed more to the nature of the fungi that happened to gain the ascendency than to the character of the pepsin itself. Specimens of these that had been standing upon the laboratory shelves since July 27th, 1888, as per date upon the label, were completely destroyed. No amount of such pepsin solutions could be made to digest any albumen whatever. In one per cent. muriatic acid solutions a slight impairment was observed, and in ten per cent. ones the ferment was almost completely destroyed. The greater destruction in the strongest and weakest of the three was rather a curious fact. The most probable explanation of the anomaly was that in the strongest solution the acid destroyed the ferment, while in the weakest the destruction was the work of bacteria. In the middle strength (viz., one per cent.) the antiseptic action of the acid tended to keep down the fungi, while not itself strong enough to destroy the pepsin.

The evidence as here given is to the effect that all solutions of pepsin are likely to deteriorate with time, through the action of the solving acid alone, and that such as contain alcohol are unscientific, as in time this agent brings about a total destruction. Wine and elixirs of pepsin soon become inert, and on standing a loose light-colored and light precipitate appears. The presence of this seems to be, so far as has yet been determined, a sure sign of the destruction of the ferment. Contact with alcohol does not destroy unless some weeks of solution occur. Time is an element in the matter. An examination of half a dozen such solutions that had stood in the drug store a few years unused showed this to be present in all, and, strange to observe, about in proportions that would be comparable with the amount of pepsin each should have originally contained. The quantity was in every instance much less than the original quantity used, but where much pepsin was, this sediment was in large amount; and where little, it was in small amount.

In experiments made by the writer in 1888, a large number of solutions of pepsin of various brands were left over unused. Each bottle bore dates ranging from June 20th to July 30th. Most of them were put up on July 27th. All of these contained precipitates like that already referred to where the acid strength was over one per cent. In amounts less than that, fungi had wrought their own methods of destruction. It was observed that in every instance this precipitate not only bore a quantitative relationship to the quantity of pepsin in the solution originally, but that weak brands even with the same weight contained less than did the stronger ones. Where about a common amount was left over of the same brand, the one having fifty milligrams to the cubic centimetre, and the other only twenty-five, the latter appeared to have only half as much of the precipitate as the former. Where about a common amount was unused of two different brands, one of which was known to have a much greater digestive power than the other, that one which originally possessed the highest digestive power contained the greatest quantity of the precipitate. The quantities too of both seemed to be related about as their digestive powers. Weak ether on standing on pepsins of various brands, and occasionally shaken, showed in a few weeks, wherever any solution at all occurred, this same form of precipitate. Here too the rule obtained of much digestive power much precipitate, and little digestive power little precipitate. Samples of these precipitates in ether and old acid solutions are before you for inspection.

When a strong solution of pepsin has methyl alcohol added to it in sufficient quantity to cause precipitation, that which settles seems to have much of the character of the sediment we have been considering, though more voluminous and a little heavier. If a solution of pepsin is heated to the boiling point, it becomes milky. In a very little time it settles in a cloud of precipitating matter, providing it is slightly acid with HCl. The ordinary digesting fluids containing 0.2 per cent. muriatic acid are of about the proper strength. This precipitate seems to be the same in character as those we have been considering. Just as the boiling of an albumen solution under proper conditions precipitates the albumen, so the boiling of pepsin solutions under proper conditions precipitates this something which the writer has taken the liberty of calling peptose. As pepsin is from a Greek word, meaning cooking, so peptone and peptose mean cooked. The word peptone has been used to mean cooked albumen. Let us now use the word peptose for cooked pepsin. This peptose has again and again, with the same pepsin in the same proportion, always come down in identical quantities. Where the same pepsin in solutions of varying strengths has been boiled, it has shown itself exactly proportional to the quantity of pepsin. With pepsins of high digestive power the precipitate is copious in amount. With weak pepsins the quantity is meagre. The proportion has always been found, in every test yet made, to bear a distinct quantitative relation to the quality of the pepsin used. Very weak pepsins only give a slight milkiness that shows no tendency to precipitate until, by continuous boiling, we reach sufficient concentration to enable it to descend. One strong pepsin was found that produced a dense milkiness, but refused to totally precipitate until it had been boiled for a few minutes. This was probably due to something in its composition which interfered with the action of the acid. As soon as it did go down its great value was apparent. The experimenter can always be sure of the total descent of peptose by the fact that it leaves the solution clear and free from the milkiness produced by the boiling. Here are filtered solutions of pepsin. Let us test them in this way: No. 1 dissolved by actual trial over 2000 parts of albumen in less than six hours; No. 2 dissolved less than 2000 parts in the same time; No. 3 dissolved about the same as No. 2 in the same time—No. 3 was a trifle behind No. 2; No. 4 dissolved a little over 1500 parts in the same time; No. 5 dissolved about 1000, and No. 6 only 600. You will observe that pains are taken to say dissolved these amounts, and not digested them. The amount they would have digested in this time is a quite different matter. Taking ten cubic centimetres of each, boiling the same and placing them in separate test-tubes with bases, as soon as the precipitate has had time to settle you will discover that each one contains an amount of peptose exactly corresponding with the digestive power as inferred from the solvent power.

It is fair to infer from all this that peptose and pepsin are correlated in some manner. The writer believes that the first is related to the second as coagulated albumen is to raw albumen. As experiments seem to indicate that all the peptose the solution contains is precipitated, if such a relationship is borne between them, we have here a means of accurately and gravimetrically determining pepsin. The reasons for believing that the total amount goes down are these: Every solution becomes clear. No solution from which precipitation has once thus occurred can by any amount of concentration be caused again to precipitate in the same manner. But weak solutions from which no precipitation occurs on first boiling can be caused to precipitate by continuing the boiling until sufficient concentration has been reached. The amount precipitated from a solution of double strength of the same pepsin is always just double. Now if the whole of the peptose did not come down, then the solution would not be so likely to become clear, and reconcentration would bring down more. Very weak solutions below the precipitation point would show a different proportion in relation to the original amount of pepsin used from that of stronger ones. A less amount of the solvent should take a less proportion into unprecipitable solution. If peptose is an accurate index of the actual amount of ferment in all brands of pepsin, then we cannot hope to be able soon to isolate by any known method anything we can truly call pure pepsin. There is no such thing as a pure pepsin in the market, and the distance we are from having one is so very great that it is almost with fear and trembling that the indicated amount in the very best goods is given. The brand giving the very highest digestive power that the writer has yet been able to secure only contained twenty-seven milligrams in a gramme. Just think of what this means! One hundred grains of the very best pepsin known contains only $2\frac{7}{10}$ grains of the pure ferment, if our conclusions are reliable. One make that was sent me as a sample of a really superb article contained barely two milligrams in a gramme, or one grain in five hundred, and its proteolytic power as tested on albumen agreed with this figure.

From the facts now presented the following general conclusions may be drawn regarding the nature of pepsin as at present supplied to consumers. That it is one and the same thing, no matter what the process of manufacture may be, is shown by all kinds possessing the proteolytic power in the same medium. The best amount of acids to aid them seems always to be the same for all pepsins, though varying according to the kind of acid. This point was determined by this writer in 1886, and was published for the first time in the New York *Medical Journal* of November 27th of that year. The following table is copied therefrom. The figures opposite the names of the acids represent the amount of albumen that was undissolved at the end of an hour, while the upper line of figures gives the per cent. of acid used in the tests. The confirmation with one other brand of pepsin agreed practically with these figures:

Per Cent. of Acid.	1	0.8	0.6	0.5	0.3	0.2	0.1
	Grms.	Grms.	Grms.	Grms.	Grms.	Grms.	Grms.
Hydrochloric	0.80	0.55	0.17	0.10	0.00	0.00	0.30
Phosphoric	0.00	0.05	0.12	0.26	0.71	0.93	2.36
Nitro-muriatic	2.10	1.34	0.31	0.20	0.00	0.21	3.91
Lactic	0.35	1.31	1.89	2.16	3.19	3.90	4.15
Tartaric	0.39	1.29	1.82	1.96	3.08	3.75	3.93
Hydrobromic	2.96	2.84	2.24	1.48	0.41	0.16	0.39
Nitric	2.27	1.93	1.57	1.41	0.60	0.71	1.89
Citric	1.47	2.22	2.50	2.71	3.73	3.92	4.06
Sulphuric	2.31	2.87	2.98	3.16	3.27	3.34	3.74
Hyperchloric	2.65	. . .	. . .	3.17	4.79	5.00	. . .
Acetic	5.00	4.60	3.52	3.19	2.93	3.04	3.11
Hydrocyanic	. .	. . .	5.00	5.00	4.87	4.01	

Prof. Chittenden of Yale, in his lecture before the Section on Pædiatrics of the New York Academy of Medicine, as published in the Philadelphia *Medical News* of February 16th, 1889, says that he had found 0.1 per cent. of dilute muriatic acid the best proportion, but he seemed to fail to note that the method he used, viz., that of Schutz, required less acid than any other, since the albumen had acid added to it before the work of digesting had begun. In a number of trials with this acid the writer determined to his own satisfaction that 0.2 per cent. is always the best, if care is taken to see that no more is used. The experimenter must not only allow for acid used upon the albumen if he uses Schutz's method, but he must also take into consideration the amount of acid contained in the pepsin itself. The fact of difference in solubility that led some to think that pepsins of various brands might not always be the same thing, is now disposed of by the discovery that insolubility is not due to the pepsin, but to the enveloping mucine. All pepsins when freed from insoluble, inert substances are equally soluble. That they are all alike in their ferment is further confirmed by discovering that coincidental with the destruction of proteolytic power there is precipitation of peptose, unless in medicines where the peptose itself is soluble. Facts seem to indicate that this substance is the full equivalent of the pepsin. Pure pepsin cannot yet be isolated and studied as to its exact nature, but a future careful study of peptose may, perhaps, shed much light on the subject. What we at present call pepsin is always a variety of foreign substances, containing a minute quantity of real pepsin. All of them contain varying amounts of peptone. One prominent make contains a considerable amount of an undescribed proteid the writer has called meta-peptone.

When soluble peptone, free from parapeptone and in solution, is neutralized and concentrated to dryness, it is found to be only partly re-soluble, and renders fresh solutions quite milky. This milkiness is due to insoluble meta-peptone. Peptone solutions boiled to dryness while yet acid contain no meta-peptone. The total mass remains soluble. Most makes contain large quantities of mucine. Some contain sulphates or sulphuric acid, and all contain chlorides or hydrochloric acid. A few makes contain a very large quantity of chloride of sodium, while some others are heavily charged with free hydrochloric acid. Coloring matters of various kinds are found in all, in varying proportions. The fact that pepsin can be purified from peptone by dialysis proves it to be a colloid. It will not go through the dialyzer. It differs from mucin in being soluble, from albumen in being unprecipitable with small quantities of a 2 per cent. solution of salicylic acid in alcohol, from peptone in being precipitated by boiling. Purification of commercial pepsins causes them to give less and less reaction with the biuret and xanthoproteic tests. What is now called pepsin is an exceedingly uncertain compound. It might, if we define dirt as matter out of place, be characterized as a lot of dirt with a trace of pepsin mixed in to give it its name. Our enterprising manufacturers will, no doubt, soon go to work and try to remove it from the possibility of so odious a simile. To positively apply such a simile would, of course, be unjust, for, so far as known, the additional substances are harmless.

HOW SHOULD PEPSIN BE STANDARDIZED?

BY R. G. ECCLES, M. D.

The consumption of pepsin has increased to such an extent within a few brief years that it now constitutes one of the most important articles of our Materia Medica. How to fix a standard for the determination of its true value as made by the various processes, has become a matter of serious importance to physicians and pharmacists. How great should its proteolytic power be ere it is considered of proper strength? What and how much impurities should be considered allowable? To the physician uniformity of product is of the greatest importance. When he has that, he can usually predict the results of a drug upon his patient. When he cannot get a product that is twice alike, he is like a soldier before the enemy who fears that his gun is a leaden one,and may burst and do more damage to friends than foes. What method should be followed in gauging the value of pepsin? How shall it be tested?

In the paper just read on "What is Pepsin?" you were shown how unreliable the mere dissolving of albumen is as a guide. Dilute hydrochloric acid of 0.2 per cent. without any pepsin will do this. With enough such acid you can dissolve all the albumen of all the eggs the hens of your neighborhood can lay. The product, however, is syntonin, and not peptone. It is clear that this much, at least, of the old process must be abandoned, and no test considered that does not depend upon the work of the pepsin itself, but on that of the acid. The last edition of the Pharmacopœia gave no directions as to how the albumen should be prepared for the test, and, as a consequence, unless experimenters agreed among themselves upon how they should treat it, such a thing as agreement of results was impossible. By common consent, and without the authority of that volume, fine comminution was adopted. Some chose grinding in a mortar, and others chose passing through a sieve with a definite number of meshes to the square inch. The writer four years ago pointed out the fact that if an iron, copper or brass-wired sieve was used, the oxides and metallic particles worn away by friction would inhibit the action of both acid and pepsin in their formation of syntonin and peptone. As the amount of inhibition would not be uniform, unreliable results would necessarily follow. On this account the National Formulary advised a hair sieve instead of a metal one. Which process, then, should be pursued in fixing the method of standardizing pepsin, if its work be still continued as its guage? Shall the albumen be ground in a mortar, rubbed through a wire sieve without regard to the metal, or shall a hair sieve be chosen? Perhaps we may be able to do away with all such methods of comminuting the albumen.

A number of European experimenters have tried dried albumen as an improved plan. In the dried state it can be powdered very fine and even. The trouble with this process is the long time consumed. At least twelve hours are required to bring the albumen into a condition for digestion by soaking, and this introduces new elements of uncertainty for comparison. It will not all absorb water evenly, and the delay in digesting, even after good soaking, is very great. The time of such a method would be, at least, three times greater than by the use of comminuted fresh albumen. Prof. Chittenden, of Yale, in a lecture before the Section of Pædiatrics of the New York Academy of Medicine, on January 23d, 1889, gave precedence to the method of Schutz (Zeitschrift für Physiologische Chemie, Band IX, p. 581.) Here are his words: "A quantity of the undiluted white of egg is freed from globulin by the addition of hydrochloric acid of specific gravity 1.12, 4.2 c.c. to 300 c.c. of albumen, shaken gently, and, after standing some hours, filtered. The fluid will then be found to have lost its viscosity and to be perfectly clear. The acid will likewise have neutralized the alkali carbonate present and converted the phosphates into acid salts. The solution, however, will not contain any free acid. 10 c.c contain approximately one gram of dry albumen. The exact amount can be determined in a sample by coagulation. The solution can be kept for some days, and so used in a large number of experiments.

The testing is conducted as follows: Ten or twenty c.c. of the albumen solution are measured out with a pipette and introduced into a suitable receptacle; a definite volume of the pepsin solution, say 50 c.c., previously prepared by dissolving a weighed amount of the pepsin (50 to 500 milligrams of the pepsin in one litre of the acid, according to its proteolytic power) in 0.2 per cent. hydrochloric acid, is added, and enough more 0.2 per cent. acid to make the entire mixture 100 c.c. The fluids are then placed in a bath at 40° C., and allowed to remain there for five or six hours (the conditions to be so arranged as not to have more than 50 to 60 per cent. of the albumen at the most converted into soluble products). * * * At the end of the allotted time, the mixtures are heated to boiling, and the acid neutralized by addition of the equivalent amount of sodium carbonate, best in approximately one per cent. solution. The unaltered albumen as acid albumen is at once thrown down as a heavy flocculent precipitate, and while still hot it is collected at once on a dry, weighed filter, washed thoroughly with boiling water, and dried at 110° C. From this is easily calculated the amount of albumen converted into soluble products under the conditions of the experiment, from which in turn can be calculated the relative proteolytic action of the pepsins tested."

The professor claims that this process gives more accurate results than any "similar" one. He probably refers to the methods of using comminuted boiled albumen. He further tells us that the first test does not give true results, as the surfaces of the albumen particles presented to the action of the pepsin are after a while much less for the stronger pepsin, and that therefore an increased amount of the weaker one must be used until the amount of the two is such that they will convert equal quantities of albumen. Here is a sample of albumen solution prepared as indicated by this process. The writer in using it has found the following difficulties confronting him.

First. You must know in advance something about the power of the pepsin you wish to test, or you cannot guage it so as to have an excess of albumen left over of 50 to 60 per cent., and unless some such amount is left over, precipitation becomes difficult and often impossible.

Second. If an excess of carbonate of sodium is used it holds in solution a large amount of the albumen.

Third. If not enough is used, the same trouble occurs.

Fourth. The exact quantity is incalculable, because the pepsins used have varying amounts of acids in them as found in the market, and because the acid originally used to produce solution of the albumen may prove to be in excess or insufficient for various reasons.

Fifth. The washing carries a variable amount of albumen into solution.

Sixth. The filtering, unless the precipitate descends as heavy flocculi because the quantity left over is just right, and unless the carbonate is just right, and the other incalculable conditions are just right, will block the filter and render the task an interminable one.

In but one way can the use of albumen in this form be used to advantage, and that is to complete digestion in every instance before the results are accepted. This can be done by successive trials with increasing amounts, until enough is used to change it all into peptone within a given time. Then the question arises as to the advantages of this process over the older one of using comminuted coagulated albumen. It has certainly one, in that all shaking during the act of digesting is done away with. This all must concede is a decided gain. As soon as the bottles or flasks are placed in the bath, no further attention is needed beyond seeing that a constant temperature is maintained. At the end of the fixed time a few drops of strong nitric acid introduced drop by drop to a little of the solution in a test tube, will tell whether or not digestion is complete. By thus completing digestion and testing with nitric acid, all errors in the use of carbonate of soda, in precipitation, in washing and in filtering, are done away with. Without this modification this test would not meet the requirements of pharmacists. The author, however, has tried two alternative processes which he deems superior, because simpler than this, and one at least of them is considered the best that has heretofore been proposed.

If the raw white of egg is, in definitely weighed or measured amount, added to three times its volume or weight of pure water and vigorously shaken, most of it is dissolved in the water. Part of it, that is mainly globuline, will not dissolve, but can be strained off by passing the whole through a piece of cotton cloth. The quantity not entering either into solution or minute suspension is very small. Any definite amount of this can have hydrochloric acid added up to the strength of 0.2 per cent., the pepsin introduced and the digestion test tried, using the nitric acid, as in the last case, to tell when digestion is complete.

To this process, as well as the one preceding, the objection of great length of time necessary for the test is applicable. Neither requires shaking, and, while the latter takes considerable longer time than the former, it has the important advantage of far greater simplicity. Here is a bottle filled with albumen in this state. The next process seems to the writer to be a very great improvement upon all others. The raw albumen is taken as before described. Fifty cubic centimetres are added to one hundred and fifty cubic centimetres of water, shaken violently a short time, strained through linen or cotton, and the amount wanted for the test put into a flask. If forty cubic centimetres are used we will have ten cubic centimetres of albumen. The flask and contents are now raised to the boiling point and kept there for about ten minutes. When examined it will be found to be a mass of coagulated albumen as finely divided as is oil in a very fine emulsion, and held as evenly suspended as if in solution. It is, in fact, a perfectly ground albumen that must always be uniform in size of particles. It has been made without the great labor of older methods, and gives results superior in accuracy to them.

The total amount must next be raised to fifty cubic centimetres by the addition of dilute muriatic acid, water and pepsin, enough to make it of 0.2 per cent. strength of the acid and such proportion of pepsin as may be desired. Here is a sample of this emulsion of albumen, and another of ground albumen, for comparison. In digesting this, like the two solutions that preceded it in description, requires no shaking nor attention of any kind until the test for completion of work is about to be applied. The work with such a solution is finished in less time than by any other process. By giving the pepsin a long enough time to work after dissolving into transparency this fine coagulated albumen, it will succeed in changing the total quantity into peptone, just as with the ordinary ground albumen. By waiting long enough the last trace of milkiness, on the addition of nitric acid, will disappear.

But it has been noted that a comparatively longer time is required to bring about a complete clearing up after a mere cloudiness is left, than to dissolve a goodly quantity of albumen before. To save time the plan was devised of leaving the final traces unchanged and having a standard comparison tube prepared to fix the end of the work. This can be done by taking some of the solution of raw albumen of the second method given and diluting it with water down to one-fourth of one per cent. Placing say four cubic centimetres of this in a test-tube and boiling, or better still adding strong nitric acid and coagulating, we get a standard opalescence that must be reached by a given amount of pepsin in a given amount of albumen solution and by a given time. The four methods of ground albumen, acid albumen, raw albumen and emulsion-like albumen, were compared as to their times of being digested by the same amount of the same pepsin. After remaining in the bath four hours, they were tested every half hour by adding five drops of nitric acid to four cubic centimetres of the fluid, and as soon as they reached the opalescence given with five drops of nitric acid in four cubic centimetres of a one-fourth of one per cent. solution of raw albumen, they were considered digested sufficiently and removed from the bath. The temperature was kept at 100°

F. All were treated alike, except that the one containing ground albumen was shaken every ten minutes to a quarter of an hour. Two hundred and fifty parts of albumen were used to one part of pepsin. The raw albumen solution was the last of the four to digest, and took eight and a half hours. The acid albumen of Schutz was next in the race, requiring seven and a half hours. The ground albumen or old method sample reached the proper opalescence in seven hours. The emulsion-like solution of coagulated albumen came out in six hours. The race was evidently won by this last method. In every way it is superior to all competitors, in simplicity of working, saving of time, cleanliness, accuracy, and fairness to rival pepsins. The results and products are invariably uniform. Very little care is required in watching progress, as there is no need of shaking or in any way agitating. The albumen is always in a condition of uniform fineness, and of a fineness far beyond anything that can be reached by any method of mechanical comminution. An extra good quality of pepsin will show itself in this at once by rapidly clearing up the solution. With a poor one it remains opaque a long time. Photographs of undissolved albumen in this process would only show clearness for the best, as there is no mass of undigested, undissolved, and badly comminuted pieces at the bottom to be brought into a picture. It steadily goes from opacity to translucence, from translucence to slight opalescence, and from this last to transparency. After that, nitric acid must be used to show the disappearance of syntonin and production of peptone.

In all kinds of tests with albumen, the pepsin should be in solution when used, and not in powder. A given volume of a solution of definite strength can easily be measured out and used. When a small amount of pepsin is weighed out for a single test, the weigher is quite sure to get a little too much or a little too little. By weighing off a larger quantity, say ten or more times the amount needed for one trial, the accuracy is far greater and the division in solution, by volume, better. This plan is the only fair one for comparative tests, since some pepsins take a long time to dissolve in the bath and their competitors have just that much time the start of them in the race.

In working the biuret test for peptone, the writer discovered that the intensity of color was due to the amount of peptone present in the solution and to the amount of sulphate of copper used. With the same amount of copper in two solutions, one of which is double the strength of the other in peptone, the shades are not alike, but as soon as the quantity of peptone is the same they are alike in color. The caustic potash or caustic soda used has no control over the matter. Much or little, the results are the same, if the proportions of copper salt and peptone are the same. It was thought that a color test might be established like that used for determining ammonia in water analyses. On putting the matter to actual trial it was soon discovered that the changes in hue were too gradual for success. The differences in weak solutions of double or triple the quantity could not be made out with certainty. At least four times as much was required. By concentrating the solution to be tested, and comparing with a prepared standard solution of peptone and definite quantity of copper salt, a nearer approach to accuracy can be made. The greater the concentration, the narrower becomes the margin of error. By bringing the contents of the comparison tube to the same hue as that of the solution to be tested, and noting that it required neither more nor less copper sulphate to do so, we can roughly determine the total peptone, and from it the amount of albumen digested. As a means of standardizing pepsin it is too inaccurate for use, but might be worked out by some one as a practical check or confirmation of the results of other methods.

We now come to the consideration of the peptose method described in the paper on "What is Pepsin?" In this the pepsins to be examined are dissolved in a definite amount of 0.2 per cent. hydrochloric acid. The best proportion has been found to be one gramme in fifty cubic centimetres, or more in this proportion if desired. With some pepsins it is advisable, owing to the difficulty of getting clear solutions of them, to use three or four times this amount. They are now allowed to stand in corked bottles in a place where they will not be disturbed until they settle clear or nearly so. The clear liquid is carefully decanted and passed through a filter. Ten cubic centimetres of each are boiled in a test tube for five or ten minutes, and allowed to precipitate. As they settle, the relative positions of the brands can readily be determined. If any of them refuse to settle or give a precipitate, reboil and concentrate until they do. Note the amount of condensation, as well as amount of precipitate, and then compare. If the concentration was to one-half the volume tried, then the precipitate must be halved. For gravimetric estimation not less than 100 c.c. of a 2 per cent. clear solution of pepsin should be used. After boiling this sufficiently it must be passed through a pair of tared filters, washed well with 0.2 per cent. muriatic acid, dried, and then weighed, the lower filter of the pair being used as a counterpoise. The weight of the dry peptose can be considered the weight of the absolute ferment present in the sample. One gramme of pepsin in 50 c.c. of seven samples gave by this method these figures: 1. Twenty-seven milligrams; 2. Twenty and a half milligrams; 3. Nineteen and a half milligrams; 4. Seventeen and a half milligrams; 5. Thirteen milligrams; 6. Nine milligrams; and 7. Two milligrams. The best contained twenty-seven parts in a thousand, and the poorest two parts in a thousand.

We have now enumerated most of the methods proposed for testing pepsin. Nothing has been said about the method of taking the clear solution of peptone and syntonin, drying, weighing and calculating from this the digestive power, as it is open to the serious objection of all the earlier plans, in giving us results that tell nothing directly of the outcome of the pepsin's work, but rather that of the acid. The use of the polariscope has not been referred to, because it is too costly an instrument for pharmacists and besides it is far from accurate in guaging the peptone formed.

While the writer believes that the gravimetric method will finally be the one chosen, it is yet too much of an infant and too great an innovation to be acceptable. The conservative instincts of the public demand that all new things be put to the test of thorough experience before great reliance be placed upon them. Hasty revolution is rarely, if ever, true growth. In obedience to the law of continuity which says, "Natura non facit saltum," we must move slowly to progress truly. The method of determining the value of pepsin by using coagulated albumen, should, for the present, be retained. Two grave sources of error should be eliminated. These are the calculating of digestion from the production of syntonin, and the trouble and inaccuracy arising from variations in fineness of comminution and unevenness of agitation. We get rid of these entirely by using coagulated solutions of albumen, instead of first coagulating the albumen, grinding, and then making a mechanical mixture with dilute acid. As a supplementary process there can be no objection to any one using the method of boiling pepsin solutions and precipitating peptose if they want confirmation of results. By its use for verifying purposes any defects it may chance to have will come out. It may turn out that a process of making may introduce inhibitory substances that will render a pepsin of very poor quality which nevertheless would show a large precipitation of peptose. Under such circumstances the gravimetric test would mislead. The article would actually contain a large amount of ferment, but it would be rendered inoperative and of little value to the user. No such pepsin has yet been found, but it is theoretically quite possible that it might exist. This state of affairs once discovered, is half mended; and the test, therefore, will become a means leading to the marked improvement of such goods if ever found. It would only be necessary to hunt for, discover the inhibiting substance and remove it.

The writer would beg of all interested in this subject, from a scientific standpoint, that they perform a number of experiments with different brands of pepsin, using the albumen coagulated in solution, making the guage that herein described (i. e., the same opalescence on the addition of strong nitric acid as is given by a one-fourth of one per cent. solution of albumen under like treatment), and report their results through the pharmaceutical press. "In a multitude of counsellors" the scriptures say, "there is wisdom." Let us have that multitude of counsellors by all means, and let us deal out fair play and even-handed justice to every manufacturer.

MR. TSHEPPE.—Do I understand Dr. Eccles to say, that he dissolved egg albumen which had been coagulated by boiling, with acidulated water without pepsin?, If so, I would like to ask him what proportion of acid he used, and how long it took.

MR. ECCLES.—Yes, I can dissolve the egg albumen if I use acid enough and digest it long enough.

MR. TSHEPPE.—I don't believe that it can be done, with all deference to the author of the paper. I have never in my life seen coagulated egg albumen dissolve in acidulated water under any conditions without pepsin. It cannot be done. I deny that it can be done.

I would like to ask Dr. Eccles what relation he thinks the precipitation from pepsin by boiling has with the pepsin itself; what is the relation between this precipitate from pepsin by heat and the pepsin itself? How do you establish that there is any relation between them?

MR. ECCLES.—I have stated the reasons why in my paper.

MR. TSHEPPE.—I don't understand those reasons. I deny that they are conclusive. I don't see that you have given any reasons at all to show that there is any relation between these two substances, or that pepsin could be determined by any such test.

MR. ECCLES.—I have stated that the amount of precipitate is always in proportion to the digestive power of the albumen under every circumstance. If you use one grain of pepsin you will just get half the amount of precipitate that you will with two grains of the same pepsin, and so with three or four. If you take two pepsins, the one with the greatest digestive power will give the greatest precipitate.

MR. TSHEPPE.—I would ask if you propose to tell us whether with the precipitation by boiling you ascertain the presence of any albumen?

MR. ECCLES.—It is impossible to give proof to one who denies a fact. When the fact is denied, it is absolutely impossible to give proof. Such a person is proof against proof.

MR. TSHEPPE.—I asked you how the experiment was made—how you would test for albumen.

MR. ECCLES.—There are five processes: which one do you refer to? The quickest one is worked out in two hours, and the others take from two and a half to seven and a half. Raise it to the boiling point in the bottle in which you want it deposited; it is not treated with acid; take 40 cubic centimetres, and afterwards add ten cubic centimetres of acid.

MR. FAIRCHILD.—There are a great many points of interest presented by Dr. Eccles' paper. He has gone into a number of details regarding the subject of pepsin, its quality, its method of assay, etc., which I think it is almost impossible for any one to take up, seriatim, at this moment. Dr. Eccles has laid great emphasis on certain points on which I think we would like to be informed as to just exactly what he means. Now, it is of course perfectly evident that he has done an immense amount of work to cover the ground that he has; but sometimes in covering a great deal of ground a paper becomes somewhat more complicated than when a less extent is taken in. Further, the multiplication of details in the experiments only serves to mystify those who are not especially familiar with the subject.

Dr. Eccles lays particular stress upon the asserted fact that he can dissolve egg albumen simply by means of acid and water, without the aid of pepsin; and for the purpose of illustration he has exhibited a vial containing a solution of albumen, which he states contains no peptone whatever, although the albumen is in solution—that the solution has been effected without the aid of pepsin. Now, it appears further that this is simply a mixture of raw albumen and water. I therefore maintain that this solution of albumen has no value whatever, as bearing upon the treatment of the coagulated albumen with acidulated water and pepsin. It serves no purpose whatever in discussing the test of pepsin upon coagulated albumen. It is true that we can dissolve raw albumen in water, we can make a solution of albumen in various ways, but what has that to do with the fact that we digest coagulated albumen by means of acidulated water with pepsin? With the acidulated water without the pepsin, and under the identical conditions of the pepsin test, the coagulated albumen is unaffected. It is solely owing to the action of the pepsin that the coagulated albumen is converted into a soluble form. It is impossible to make a solution of coagulated egg albumen with acidulated water under any conditions for use in testing pepsin. No one has ever been able to digest coagulated egg albumen with water acidulated with any proportion of acid under which pepsin is competent to act, at a proper temperature for peptic action. Now, if we take coagulated albumen with the acidulated water at a temperature of 105° F., without pepsin, and submit it to constant agitation, for say six hours, at this temperature, we will find that there is no evidence of any digestion of the albumen. The supernatant fluid will be as clear and bright as at the outset. We will find upon examination that a certain amount of the acid has been neutralized by the alkali contained in the albumen, that a certain amount of the acid will have formed some union with the albumen. If, on the other hand, we take coagulated albumen under the same conditions with pepsin, we will find that it will undergo solution; that there will be more or less complete digestion of the albumen, depending upon the proportion of the ferment to the albumen.

In this connection it is noteworthy that Dr. Eccles lays considerable stress upon the use of the word "dissolved" in distinction to "digestion;" but I hold that it is not a solution in any sense that this is commonly understood, that it is not a solution in the sense in which we would describe the action of any solvent, water, we will say, upon sugar or iodide of potassium, where we do not alter the character of the substance dissolved—where, by driving off the water, we can recover the substance itself. It is not a solution of coagulated albumen. It is converted albumen. The albumen becomes soluble owing to its conversion by the digestive ferment. This converted albumen in solution bears little resemblance to the original albumen in its physical properties, and differs materially from it in its behavior in every direction.

The action of pepsin upon albumen is a purely physiological one. We do not know how the pepsin acts. We simply know the result of its action, which is by the conversion of the insoluble albumen into a soluble form. As to the result of that digestion, the proportion of peptone formed from any given amount of albumen, that is another matter. That can only be ascertained by quantitative determination. Now, Dr. Eccles states that he finds peptone more or less in all pepsins, and, therefore, I think, has stated that all pepsins are peptone pepsins. The Doctor has also stated that there are two distinct varieties of pepsins, one of which is in the main soluble and more or less hygroscopic, and another which is in a great measure insoluble and which is not susceptible to the atmosphere, and which has not the characteristics of peptone.

It is a matter, I think, of common knowledge that there are two distinct kinds of pepsin, one of which is properly and commonly described as peptone pepsin, and is so described in the original patent for this form of product. For instance, in the ordinary method of extracting pepsin by the maceration of the stomach with hydrochloric acid, with which many of you are familiar, it is done in a cool room, and, under the influence of acidulated water, the mucous membrane is seen to swell, and there is formed a more or less viscid solution, which, upon clarifying and precipitation, yields a pepsin, which having been purified and dried, is easily distinguished in its physical properties and in its degree of solubility from the peptone pepsins. If we take the stomach or the mucous membrane with the acidulated water under the influence of heat, then we find that the mucous membrane, or, indeed, the whole stomach, may go into solution; that this solution having been clarified, condensed and dried, yields a substance which has the properties characteristic of peptones, substances which differ materially from the insoluble pepsins. It is well known that it is difficult to avoid the formation of a slight amount of peptone during the progress of the necessary operations in the manufacture of pepsin at some period. Even the solution already alluded to, which Dr. Eccles has shown, of the raw albumen in water, which he stated contained no peptone, was found as we saw upon tests, to really show the presence of peptone formed since the solution was prepared for the experiment.

I understand that Dr. Eccles criticizes the present method of testing pepsin. There can be no other conclusion from the statements and illustrations that he has made. On the other hand, he proceeds to offer a test for pepsin, which is no more nor less than to treat coagulated egg albumen with acidulated water and pepsin and the ferment. He simply proposes to mix the raw albumen with water and then coagulate it, which is simply a variation in detail, but does not in any way alter the conditions. It is strange if coagulated albumen is dissolved with acid and water under the circumstances shown in testing pepsin, that this plan has been used for so many years by physiological chemists and experimenters all over the world, including Dr. Eccles himself. In determining, for instance, the influence of various substances upon artificial digestion, it is common to make what is known as a control test, in which we have the given amount of water, acid and albumen and the ferment, by which we have the digestion of a known, maximum amount under arbitrary conditions.

Now, if the acidulated water were itself capable of dissolving the albumen, or any appreciable amount of it, it is certain that all conclusions based on these tests would be useless; for, under the circumstances named, one pepsin would digest the same as another. For Dr. Eccles states that he can get the same results from brick dust and a great variety of substances that he can from pepsin. I certainly am at a loss to understand the bearing of these statements upon the method of procedure in common use for determining the digestive value of pepsin. I would also like to understand more fully what Dr. Eccles intends to bring out in the method he proposes, of boiling a solution of pepsin, by which the pepsin is coagulated and thrown out of solution. I agree with Mr. Tsheppe inasmuch as I cannot see how, by this means, we can determine the presence of pepsin. It may be taken for granted that, as Dr. Eccles states, the more pepsin, the more precipitate there will be, but the question is, how are we to know that the precipitate is pepsin? We cannot thus determine the presence of the pepsin unless the experimenter has introduced the pepsin himself, or has made a preliminary determination of its presence by the exhibition of its action.

I cannot see how it helps us to give the precipitate a name, when we have no description given of the characteristics, properties or behavior of this boiled pepsin, of this pepsin coagulated and precipitated by heat, by which it is identified with the peptic ferment —as a correlative of it. It is, of course a very common experience in the operations with digestive ferments to boil the whole digesting mass at any given period in its action, to destroy the ferment when the work desired has been accomplished. And, in experimental work, it is common to destroy and remove the digestive ferment by boiling the solution and filtering it. Suppose, for instance, Dr. Eccles makes a solution of a substance which may be supposed to be pepsin—and which he has purchased for pepsin—in acidulated water, and then boils it with the results which he has already described. How is he to know that this coagulation is positively derived from an active ferment? Is it not quite possible that the ferment may have been, unknown to the operator, submitted to conditions which have destroyed its vitality, which have rendered it incapable of digestive action without having destroyed its physical property or behavior to any known reagent? For instance, we may take from among several solutions of specimens of pepsin in acidulated water, one which has been subjected to a temperature, say, of 180 degrees F.; the pepsin will not have been precipitated, the solution will not have altered in its appearance, while the ferment will have been destroyed. Will not this ferment give the same precipitate upon boiling as any other of the experimental solutions containing active pepsin? Such a test as the Doctor proposes can only be corroborated by the test of digestive action, as this test is one which in its very employment destroys the ferment once for all.

Dr. Eccles has given us the report of a great number of experiments of the influence upon pepsin of a great variety of reagents. We have also during the past years, the report of a great variety of experiments in the same direction also, of experiments by Dr. Eccles himself and others upon the influence of other substances upon the artificial digestive operations.

Now, what the pharmacist needs above all, is to get at the bearing of these experiments, to see what conclusions are to be drawn from them and what is their practical purport. All the experiments dealing with the influence of a great variety of substances upon artificial digestion demonstrate that few of them can be of practical value to the pharmacist or the physician. For instance, Dr. Eccles will remember one test in which he was called upon to examine some pills made of pepsin and iron by hydrogen. In testing these pills, Dr. Eccles found them inert, and concluded that the pepsin was destroyed by the iron. In a later paper dealing with the subject, Dr. Eccles ascertained that the influence of the iron was solely due to the fact that it neutralized the acid; that when this neutralization was compensated for, it was seen that there was no further interference with digestion. In consequence it was evident that iron by hydrogen with pepsin in the pill form had no influence whatever upon the ferment. So the same thing may be said of a great number of similar experiments in which such substances as whey, sugar or peptone, are seen to influence the artificial digestive process. For instance, if we start with a certain control test and take a series of other experiments in which we have varying proportions of alcohol, it has been found that the amount of work done under given conditions will be diminished by the alcohol, say in 10 per cent. The influence of the alcohol upon the digestive operations is not due to any injurious effect that the alcohol has under these conditions upon the ferment itself, but simply because this percentage of alcohol brings in a new factor that alters the conditions. It affects the value of the water as a medium for the activity of the pepsin. Pepsin does not act in alcohol. Alcohol is not a solvent for the derivatives of the digestion of albumen. It is water which is essential to the action of any digestive ferment, and so it is with all this series of experiments. If we have any appreciable quantity of a substance soluble in water, it will to that degree lessen the value of the water as a solvent and a medium for the pepsin action, not because the peptone or the sugar, for instance, in itself has any injurious action on the ferment itself under these conditions. Are we to conclude then that a physician will not administer alcohol to a patient?—that the pharmacist shall not use a hydro-alcoholic menstruum for the digestive ferments, when it is a well-known fact that we can make active extractions from the stomach or pancreatic gland with menstruum containing about 15, 20 or more per cent. of alcohol, by which means we can make solutions showing not only the behavior of the ferments, but which are so active as to be capable of practical application.

What we need above all to know and to keep in mind are those conditions which injure or destroy the ferment itself. We need to know what those substances are which injure the ferment in the flask or in the bottle, in order that the physician may not mix or prescribe these substances together, and that the pharmacist shall not prepare or offer them under these conditions.

There are so many points to be touched upon that it is impossible to go into any further detail at this time, and I will only say in conclusion that although the test of pepsin is, as I understand it, so much criticized in this paper, I do not see on what ground the criticism is sustained. I look upon the test of pepsin as at present employed, as perfectly reasonable and fair, as one which affords an experimenter a practical means of determining the comparative digestive value of any product submitted to him. In the long run, I believe that an experimenter can form perfectly reliable conclusions as to the digestive value of these products.

In fine, from my own experiments I think it may be said that the various products of pepsin as made by various methods will be found to be remarkably constant in digestive activity, that one will be very nearly able to know just about what may be expected of any product with which he is familiar. I believe that any person purchasing these products upon the basis of their digestive value will be able to do so with just as much confidence in the main as he would in determining any other products by the method of assay. As to the amount of peptone formed by pepsin in distinction to the amount of albumen converted into a soluble form, I will only say that it seems inconceivable that there can be a pepsin which, while it will not convert as much albumen as another, yet will make more peptone. I believe that the pepsin which will under given conditions convert the most albumen into solution will be found to have formed the most peptone. I believe that in the labaratory of the manufacturing chemist to-day, pepsin and the digestive ferments are produced on a large scale of high digestive activity and practical value—of such activity as to justify their medicinal employment, and certainly make them capable, as is well known, of practical application in artificial digestive processes. As to the substances with which pepsin is associated, it must be held that we are more and more ascertaining how to eliminate substances which are not the essential element of digestion. For, as Dr. Eccles has found, even in the last year remarkable progress has been made along the whole line, so that it seems a hardly justifiable exaggeration of terms to speak in the way he has done.

Mr. Good.—The paper read by Dr. Eccles is full of suggestions, and shows that he has done a good deal of research; but he has made certain statements which he has failed to verify sufficiently. They are well enough as assumptions, but he has failed to prove that they are facts. It certainly is highly interesting to know that there exists, as he states, a correlation between the amount of precipitate formed, and the dissolving action of the pepsin. The fact is interesting, and as far as I know absolutely new, but he drew from this fact two conclusions: one was, that the relation of albumen to precipitated albumen should be identical with the relation of pepsin to this new substance which he terms peptose. I think he failed entirely to prove the correlation, simply for the reason that he has furnished no proof that this precipitate is actually coagulated pepsin. It might be that pepsin on being heated splits up into some new substances, one of which is being precipitated while another portion of the same pepsin remains in solution. This fact would at the same time prove the incorrectness of his second assumption: namely, that the various pepsins in the market are simply a certain amount of material containing a trace of the active principle. This precipitate may be a constituent of the pepsin, but he has not proved that it is actually the pepsin.

Mr. Hallberg.—As much as I like to listen to such a comprehensive contribution to our knowledge of the ferments and of albumen, I am in accord with the remarks made by Mr. Good. If any benefit is to be obtained from a paper of this kind, it is through the ready means by which the digestive strength of pepsin may be discovered. As far as I was able to follow Dr. Eccles, he has not in any way shown how this peptose, as he calls it, has any relation whatever to the true digestive principle of pepsin. It is entirely assumed on his part. If it does happen that there is a concurrence in the percentage of precipitation with the digestive strength of the different samples used, that is not by any means conclusive. It doesn't justify him in drawing any such conclusions as he has done. Inasmuch as the doctor has gone into the subject so comprehensively, I am surprised that before he brought the subject before the Association he did not finish the matter up one way or the other, so as to know just exactly what the substance is.. I take exception also to the name he applies to the substance. I think that the term peptose has been used for a good many years past in Europe, especially among German writers; and while I do not know now to what particular principle it has been applied, still I do not think that any substance of which we know nothing, except that it has a peculiar physical property, is entitled to a name which we might possibly find more useful elsewhere. I therefore move that the paper be referred to the Committee on Revision of the Pharmacopœia.

MR. RICE.—I am sorry that Mr. Hallberg has made the motion, as I think he will see that it is not the duty of this Section to dispose of the paper in that way. I think if the paper is to be referred to the Committee on Revision of the Pharmacopœia, we ought to send it by the author. Of course this Association can do anything it desires in that regard, and the Committee on Revision will be glad to receive documents sent to them; but when a paper has been received in the way in which this was received, showing much painstaking care in its production and industry bestowed on the experiments it describes (in spite of the discussion as to the correctness of the stated results), I think the proper thing to do is to refer it back to the author with thanks, and with the recommendation that he complete the information desired, so that it may be brought before this Association in a complete form.

MR. HALLBERG.—In view of that explanation of the matter, I will withdraw my motion.

MR. CURTMAN.—We have a paper here to which objections have been made, one being that the subject of which it treated has not been exhausted nor entirely carried to its final results. On the other hand, a number of facts therein stated have been doubted. The paper, however, has evidently been the result of a great deal of laborious research, and while it may not be regarded as having arrived at definite results, yet these first steps are valuable guides for us. Some of the statements made may afterwards be controverted, and certain conclusions disproved, but still I hope that the paper will be received and referred to the Committee on Publication. All steps taken in an investigation that may take years to accomplish final results, are valuable, and should be preserved for the guidance of those who may follow in the same path. I move that the paper be referred to the Publication Committee.

MR. ECCLES.—I do not understand the attitude taken by some members. It is singular. There has never yet been a paper presented to this Association, and never will be as long as it lasts, that is perfect. That I should be asked to perfect this paper is simply absurd, and reflects but little credit on the men who propose it. It is really remarkable that Columbus after having discovered the Islands of the West Indies was kicked back by Spain to find America, as if he hadn't found the new world. But here is something that is found.

MR. SAYRE.—I hope that this paper will take the usual course, and I rise to second the motion that has been made, to refer it to the Publication Committee.

MR. REMINGTON.—Would not Dr. Eccles like the privilege of a little more time to work on some of the conclusions at which he has arrived? I think I can put myself in Dr. Eccles' position in this matter. This Association has not been in the habit of throwing cold water on any one who gives the result of careful investigation. If the matter is referred to the Publication Committee, as it should be, with power to act in the matter, with the exception that if Dr. Eccles wishes to clear up some of these points in the paper which have been criticized, the committee should have power to accept such amendments as Dr. Eccles may make, so as to put the matter in better shape.

MR. FAIRCHILD.—As far as I am concerned, I rose to make the original motion that the paper be referred to the Publication Committee, and I would like to see it done. On the other hand, I was extremely anxious to get a few facts boiled down, so as to know what the deductions of the author of this paper really were, on account of the remarkable emphasis he has laid on certain facts which seem to me to have no bearing on the question. The conclusions are not corroborated, because it is evident you cannot test a substance by an agent which destroys it. When you test a pepsin in that way, you kill it. Now, if we are going to find out that by the boiling we have precipitated a pepsin, it is an interesting fact. I wanted to get at what the deductions were regarding it.

Mr. Rice.—My idea in suggesting that the paper be referred to the Committee was the same as Professor Remington's—not to reject the paper. I think the doctor is able to complete the paper, and for the purpose of enabling him to put it in good shape, I think it would be a good idea for him to have the papers returned so that he can go over them. The other idea was that, under the circumstances, I did not think the paper should be referred to the Pharmacopœia Committee.

Mr. Haigh.—It strikes me that this Association does not quite take this paper in the spirit that it should be accepted. It is the custom, I believe, for the Societies in Europe to give all possible encouragement to research of any kind. It is not necessary for a man to complete any research that he may be undertaking when reporting his progress to these societies. It is a common courtesy extended to any original investigator, that when he announces he is doing certain work no one else interferes with his work, but he is permitted a certain time to complete it. From time to time he makes such investigations as he can, and reports to his Society, which encourages him by publishing these reports, and by giving the benefit of such work to the world. Now it seems to me nothing but common courtesy to receive this paper as it was intended. Dr. Eccles has himself acknowledged that the work is not complete, but he has certainly done much valuable work which will aid others in their labors, and we should give him all the encouragement we can. It is true that American investigators to-day are not doing enough original work, and certainly not to the same extent that our confreres in Europe are doing, which is due to a variety of causes; and I say, therefore, when original investigation is presented, we should encourage it all we can. I hope the paper will take the usual course and be published.

After some reference to the policy of omitting the names of manufacturers mentioned in the essay, both papers were referred to the Publication Committee.

Mr. Remington moved that a special session be held in the evening for the purpose of transacting unfinished business left over by reason of the time occupied by the reading of Mr. Eccles' papers. The motion was seconded and adopted.

Mr. Remington presented the following report of the Committee on the Chairman's Address, which was accepted :

The undersigned Committee on the Chairman's Address present the following report, viz.: All the suggestions in said report are so eminently proper and conducive to the best interests of the Association as an organization and of the several members in their individual capacity, that they are most heartily endorsed by your Committee, and we recommend that they be adopted.

Joseph P. Remington,
Dan. T. Wooldridge,
S. A. D. Sheppard.

Old Point Comfort, September 10, 1890.

The Section now adjourned, to meet again in special session at 8 :30 p. m.

SPECIAL SESSION.—WEDNESDAY EVENING, SEPTEMBER 10TH.

The Section met at 8:30 p. m., when the following paper was read:

BELLADONNA PLASTERS.

BY SEWARD W. WILLIAMS.

In few directions has pharmaceutical progress been more marked than in the perfection of emplastrum belladonnæ. The evolution of a standardized and permanently flexible plaster prepared with uniformity by the thousands, from a rude mixture of drug resins and soap spread by hand, compares favorably with other improvements in pharmacy. Originally lacking in appearance, uniformity and keeping qualities, the best belladonna plaster of to-day looks well, keeps well, acts well, and is practically definite in strength.

PHARMACOPŒIAL RELATIONS.

The United States Dispensatory of 1833, quoting from the Dublin Pharmacopœia, gave as a formula for belladonna plaster: "Take of the inspissated juice of the deadly nightshade (extractum belladonnæ), 1 ounce; soap plaster, 2 ounces. Make a plaster." The preparation was favorably commented upon as a useful anodyne application in neuralgic and rheumatic pains.

In the next issue of the U. S. Pharmacopœia (1840), emplastrum belladonnæ was first made officinal in this country. The formula was: "Take of resin plaster, 3 ounces; extract of belladonna, 1½ ounces. Add the extract to the plaster previously melted by the heat of a water-bath, and mix them." The extract employed was prepared from the coarsely powdered leaves of Atropa belladonna by percolation with diluted alcohol. This formula remained practically unaltered in the U. S. Pharmacopœias of 1850 and 1860. In 1870, however, a change was made to root extract. Belladonna root was directed to be extracted with full strength alcohol, and enough resin plaster incorporated with the finished extract to make the mass up to the original weight of the root. The present U. S. Pharmacopœia continues these directions to prepare 100 parts of plaster mass from 100 parts of root.

To briefly compare the belladonna plasters of other countries, the British Pharmacopœia of 1867 gave as a formula for belladonna plaster: "Take of extract belladonna and resin plaster each 3 ounces; rectified spirit (84 per cent. alcohol) 6 fluid ounces; rub the extract and spirit together in a mortar; decant clear portion; concentrate and mix extract obtained with the resin plaster." The extract used was prepared from the leaf. In 1885 the British Pharmacopœia substituted root for leaf extract, and directed the plaster to be made by incorporating 1 part of alcoholic extract of belladonna root with 2 parts each of resin and soap plasters.

The German Pharmacopœia of 1873 directed belladonna plaster to be prepared by mixing 2 parts of finely powdered belladonna leaves with 4 parts yellow wax and 1 part each of turpentine and olive oil. In 1883 this plaster was dropped with about 30 others from the Pharmacopœia Germanica. The French Codex gives no formula for belladonna plaster, presumably recognizing the almost universal employment of the manufactured article. The Spanish Pharmacopœia directs the incorporation of 85 parts extract and 48 parts "oil of belladonna" with 320 parts of pitch plaster. The Belgian Pharmacopœia authorizes a mixture of 5 parts extract belladonna with 2 parts olive oil and 33 parts of Burgundy pitch plaster. The Swiss, Netherland and Russian Pharmacopœias direct the incorporation of finely powdered belladonna leaves as follows: Helvetian, 10 parts leaves, 10 parts yellow wax, 3 parts colophony, 5 parts olive oil and 2 parts turpentine (t. larcina); Netherlands, 10 parts each of leaves, yellow wax and lead plaster, with 5 parts of olive oil; Russian, 10 parts leaves, 3 parts yellow wax, 1 part colophony, 20 parts lead plaster, and 2 parts olive oil.

While the Homœopathic Pharmacopœia gives no formula for belladonna plasters, not a few manufacturers seem to operate on the theory of attenuation. Recent analyses of several makes showed one to represent the dangerous (!) potency of 0.01 per cent. alkaloid; one assayed 0.11 per cent., and another 0.24 per cent. Three samples of a fourth manufacturer, however, figured 0.34, 0.35 and 0.39, while numerous assays of a fifth make assayed quite uniformly at from 0.49 to 0.50 per cent. alkaloid.

Notwithstanding the numerous pharmacopœial formulas for emplastrum belladonnæ, practically ninety-nine hundredths of our subject properly belong to the manufactured rubber combination plaster. That is to say, about 99 per cent. of the belladonna plasters used are prepared by manufacturers in rubber combination. Experience has proved it practicable to follow the spirit but not the letter of the Pharmacopœial formula, making an improved mass represent the proportion of drug directed.

STANDARD OF STRENGTH.

The Pharmacopœia has as yet given no standard of strength for belladonna plaster. To say, make 100 parts of mass from 100 parts of root, is but to say, make the plaster vary as the drug does.

Authorities, cited by the United States and National Dispensatories, report belladonna roots examined by them to have yielded 0.66, 0.44 and 0.25 per cent. alkaloid. Professors Dunstan and Ransom* say three samples yielded respectively 0.35, 0.38 and 0.39 per cent. of total alkaloid. Dr. E. R. Squibb † found the root to range in strength from 0.42 to 0.50 per cent. Mr. Wm. Simonson‡ analyzed a large number of samples of belladonna root, which ranged from 0.22 to 0.75 per cent. alkaloid, and considered 0.50 a fair average for good specimens. Dr. A. B. Lyons* reports belladonna roots to have yielded 0.90, 0.54, 1.52, 0.67, 0.47, 0.67, 0.86, 1.35, 0.79, 0.59, 0.54, 0.64, 0.60 per cent. alkaloid. The last mentioned results were obtained by titration with Mayer's reagent, half strength. However, one sample assaying by this method 0.54, when the alkaloid was extracted, purified and weighed, calculated 0.55, showing that his figures by volumetric work are not necessarily higher than would have been obtained by strictly gravimetric analysis. These assays, including those of a few extremely strong roots, show an average of 0.78 per cent. alkaloid.

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* Pharmaceutical Journal and Transactions, December 14, 1889, page 465.

† Ephemeris, 1880, page 855.

‡ Proceedings American Pharmaceutical Association, 1889, page 120.

By these figures a variation in strength of belladonna root from 0.25 to 0.75 per cent. alkaloid is fairly established. Obviously, therefore, of two belladonna plasters one may be 200 per cent. stronger than the other, and yet both be strictly Pharmacopœial.

Having during the last few years had charge of the extraction and assaying of many tons of Atropa belladonna root and Belladonna scopolia rhizome, the writer considers 0.50 per cent. for the former and 0.58 per cent. for the latter fair averages. As Atropa belladonna is still officinal, and the plaster directed to be the strength of the root, belladonna plasters with which he has to do are standardized to practically one-half of 1 per cent. alkaloid.

THE DRUG EMPLOYED.

The leaf and root of Atropa belladonna have generally been used in the preparation of belladonna plasters. It is needless, however, to devote time and space to a consideration of the long officinal belladonna so familiar to all, and we will at once turn to what we are thoroughly satisfied is its rightful successor.

In 1886 Mr. George J. Seabury strongly advocated the use of Belladonna scopolia, claiming it to be superior to Atropa belladonna.

Thorough trial in the laboratory convinced us that from a pharmaceutical and analytical standpoint he was correct, and most favorable results from the employment of plasters in medical practice completed a thoroughly practical demonstration of the general superiority of the then new drug. Since that time ton after ton of this rhizome has continued to show a most remarkable excellence and uniformity.

The appearance of the drug is shown by Fig. 1 (see p. 158)—a reproduction of a photograph taken from specimens just as removed from one of our bales. The rhizome is often split, as shown by the smaller specimens.

Those interested in this belladonna of the future (Scopola carniolica) will find the subject treated very fully in the *Pharmaceutical Journal and Transactions* for December 14, 1889. We will not stop to consider the plant as there treated further than to note in brief that Professors W. R. Dunstan and A. E. Chaston found the alkaloid to be hyoscyamine, and the drug to resemble belladonna to the further extent of containing cholesterin and a highly fluorescent principle. Mr. F. Ransom found two samples to assay respectively 0.43 and 0.51 per cent. alkaloid. Sir Dyce Duckworth, M. D., found comparative hospital experiments with Belladonna scopolia and Atropa belladonna preparations to rather favor the former. Among the names noted by E. M. Holmes, F. L. S., as having been given to Belladonna scopolia are: "Scopolina atropoides," "Atropa caule herbaceo" and "Scopola carniolica," which latter he favors. While cross sections of the two drugs show some slight differences, Mr. Thomas Greenish says, in concluding his histological report on the subject: "On the whole, it will be evident from this histological interpretation that there seems a close alliance in anatomical structure between the rhizome of Scopola carniolica and the root of Atropa belladonna.

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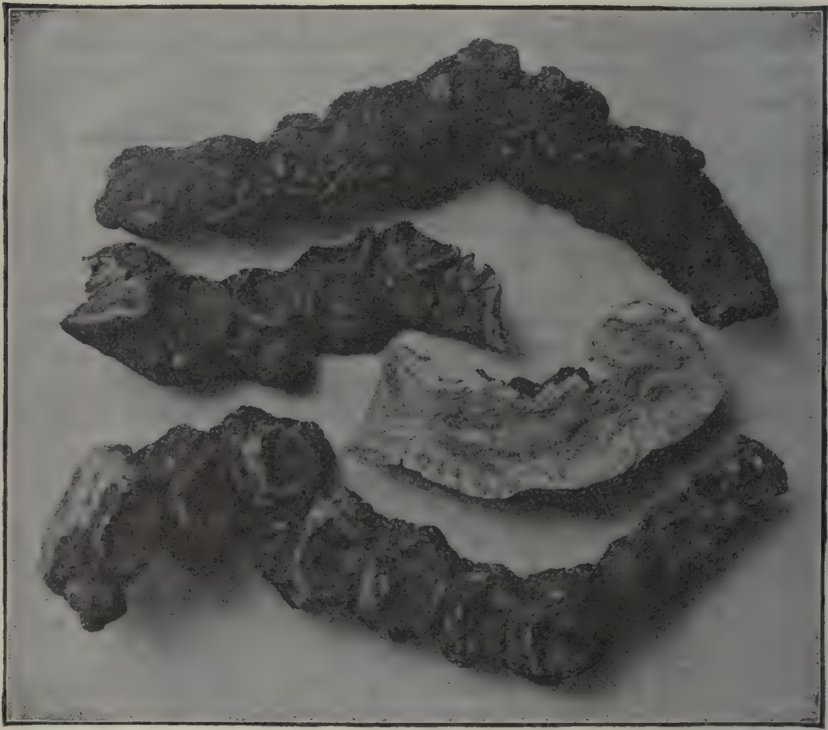
* Pharmaceutical Assaying, Lyons, page 148.

FIG. 1.

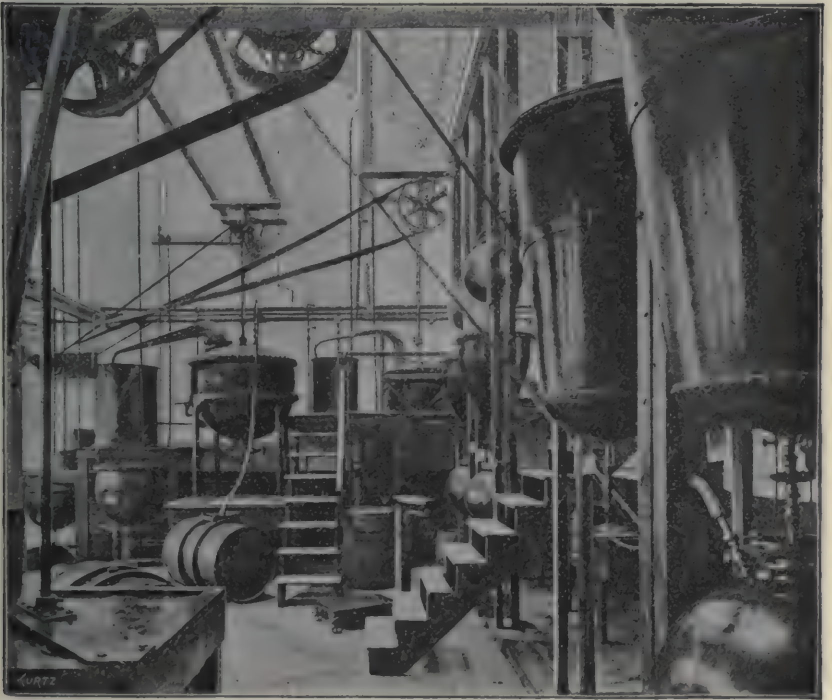


Belladonna Scopolia Rhizome—Natural Size. (*Scopola Carniolica.*)

THE EXTRACT.

In the process adopted by the writer, the rhizome is dried, ground and sifted through a long rotary sieve, which deposits Nos. 40 and 60 powder in separate bins. From 100 to 250 pounds of the powdered drug are evenly moistened with 80 per cent. alcohol in a large mixer provided with running stirrer. The moistened drug is packed in tinned copper percolators, using 40 powder below and 60 above, and allowed to macerate for about 24 hours. It is then percolated with 80 per cent. alcohol, the process being completed by vacuum produced on globe receivers connected with percolators. The style of percolator is a modification of the form designed by the late W. M. Thomson, of Philadelphia. The next and most important step is the concentration of the fluid extract thus obtained. In order to provide for rapid evaporation at the lowest possible temperature, we designed a large tinned copper vacuum still, with running stirrer, which has operated to our entire satisfaction, practically no leakage occurring through packing box, which admits shaft of stirrer. Pipes lead from a

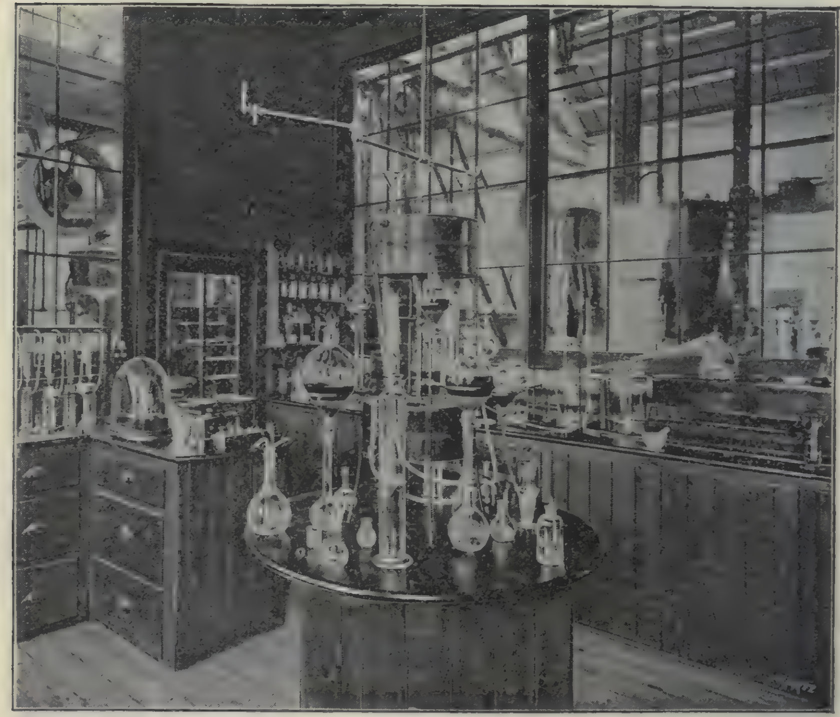
FIG. 2.



Extract Percolators and Stills.

powerful vacuum pump to the still and the receivers of all percolators, providing for a vacuum at any point where desired by simply turning a valve. Fig. 2 (p. 159) shows in part the apparatus used in preparing the extract. Evenly moistened in large mixer at the left of the foreground, the drug is extracted in the percolators at the right, the fluid extract removed to large drum below still shown in background, a vacuum produced on still, a valve opened connecting with suction pipe leading from drum to still, the fluid drawn into still, valve closed, and evaporation proceeded with under reduced pressure of from 25 to 27 inches, until alcohol is recovered in receiver and the extract is reduced to proper consistence to be drawn off warm through large gate-valve at base of still.

FIG. 3.



Corner of Analytical Laboratory.

The extract is next sampled and assayed for total alkaloid by a process similar to those given under "assays." The percentage so ascertained is marked upon the large tins in which the extract is transferred to Plaster Department, and there the amount incorporated in the mass is apportioned to the assay. For instance, of an extract assaying 2.4 per cent. alkaloid, 21 pounds are used in preparing 100 pounds of mass. A corner of the

Analytical Laboratory, shown in Fig. 3 (p. 160), will give an idea of the apparatus used in the assay process, although the all important analytical balance (sensitive to one-tenth milligram) does not appear.

To show with what degree of uniformity Belladonna scopolia works in the large way, we append a tabular statement of our weekly runs for six months (October 27, 1889—April 26, 1890). As this extract is entirely consumed in the manufacture of plasters, an idea can be formed of the output of one manufacturing plaster plant.

WEEKLY RECORDS OF SIX MONTHS' WORKING OF BELLADONNA SCOPOLIA.

Pounds used of dried drug.	Pounds yield of extract.	Percentage yield of extract.	Per cent. alkaloid in extract.
1,200	320	26.6	2.20
1,000	259	25.9	2.16
800	211	26.3	2.46
1,200	317	26.4	2.10
1,200	331	27.5	2.48
1,000	277	27.7	2.22
1,200	336	28.0	2.11
1,200	335	27.9	2.00
1,200	311	25.9	2.30
1,000	258	25.8	2.25
1,000	272	27.2	2.10
800	198	24.7	2.45
1,500	367	24.5	2.45
1,300	308	23.7	2.45
1,200	283	23.6	2.40
1,250	310	24.8	2.40
1,750	454	25.9	2.45
1,700	416	24.4	2.30
1,300	315	24.2	2.40
1,800	453	25.1	2.40
1,700	419	24.6	2.40
1,400	345	24.5	2.50
900	228	25.3	2.60
1,050	250	23.8	2.60
1,300	321	24.7	2.40
1,200	275	22.9	2.60
1,000	220	22.0	2.50
33,150	8,389	(683.9)	(63.68)
Average.	Average.	Average.	Average.
1,227	310.7	25.3	2.358

The average yield of extract obtained by extraction of Belladonna scopolia rhizome with 80 per cent. alcohol is thus shown to be 25⅓ per cent., the average percentage of alkaloid in extract 2.358 per cent., and the average alkaloidal strength of over 16 tons of the dried rhizome, 0.59 per cent.

In the vacuum process employed, the hyoscyamine usually so readily converted to atropine is presumably largely left unchanged; but as we found the factor indicating its combining power with Mayer's solution to be within the limits of variation in pure, dry atropine itself, we consider the results as fairly accurate for the mixed alkaloids, whatever may be the proportion of the mydriatic isomers. This point affords in itself the subject for another paper.

We have stated that 80 per cent. alcohol is used for extracting the drug. This is considered the best strength for our purpose, not because it most easily extracts the rhizome, nor because it yields the strongest extract, but on account of its being a happy medium between the comparatively poorer extractor of strong and better extractor of weak extract. The table given herewith will show the relative value of alcoholic menstrua of varying strengths. In preparing this table we have aimed, by dividing the percolates as obtained, to show as well the relative ease with which the extractive and active principles are removed from the drug. Six portions of 100 grams each (Nos. 40 and 60 powder mixed), were macerated three days and extracted with alcohol of the percentages stated. It will be noticed that 65 per cent. alcohol extracts the drug more readily than any of the stronger or weaker menstrua tried, the quality increasing and the quantity diminishing just as the alcohol is increased in strength, and as the menstruum is further weakened the quantity increasing and alkaloidal strength diminishing. The table shows 94 per cent. alcohol to yield the strongest extract, while 65 per cent. alcohol extracts the drug in smaller proportion; 80 per cent. alcohol, however, seems to have the most points in its favor, as viewed by the plaster manufacturer. As a matter of interest it may be noted that mold attacks the extractive matter and apparently not the alkaloid, moldy root when dried assaying higher than well preserved dry samples.

TABLE SHOWING THE STRENGTH OF ALCOHOL BEST ADAPTED TO BELLADONNA SCOPOLIA.

Strength of alcohol.	Percolate evaporated.	Yield of extract, grams from 100 grams.	Weight of alkaloid.	Per cent. alkaloid in extract.
94 per cent.	Total Extract.	13.15	0.540	4.10
	1st, 50 c. cm.	2.84	0.138	4.85
	3d, 50 c. cm.	1.91	0.090	4.71
	5th, 50 c. cm.	1.10	0.015	1.36
80 per cent.	Total Extract.	21.20	0.564	2.66
	1st, 50 c. cm.	3.63	0.165	4.54
	3d, 50 c. cm.	3.53	0.126	3.56
	5th, 50 c. cm.	3.18	0.015	0.47
72 per cent.	Total Extract.	24.50	0.564	2.30
	1st, 50 c. cm.	4.56	0.159	3.48
	3d, 50 c. cm.	4.73	0.129	2.72
	5th, 50 c. cm.	3.71	Trace.	Trace.

Strength of alcohol.	Percolate evaporated.	Yield of extract, grams from 100 grams.	Weight of alkaloid.	Per cent. alkaloid in extract.
65 per cent.	Total Extract.	27.49	0.552	2.00
	1st, 50 c. cm.	6.28	0.168	2.67
	3d, 50 c. cm.	6.01	0.102	1.69
	5th, 50 c. cm.	2.54	. . .	. . .
50 per cent.	Total Extract.	29.56	0.540	1.82
	1st, 50 c. cm.	8.69	0.174	2.00
	3d, 50 c. cm.	5.12	0.072	1.40
	5th, 50 c. cm.	2.34	0.030	1.28
25 per cent.	Total Extract.	38.46	0.540	1.40
	1st, 50 c. cm.	9.60	0.120	1.25
	3d, 50 c. cm.	8.56	0.108	1.26
	5th, 50 c. cm.	4.22	0.054	1.28

The interesting increase in strength of extract with 25 per cent. alcohol led us to repeat the process, when the change was even more marked. With stronger menstrua, therefore, the first percolates are shown to yield far the strongest extract, while with very weak alcohol the extracts from the latter percolates are somewhat stronger. The sixth and last portions of 25 per cent. percolate raise the strength of total extract above that obtained from first 50 c. cm., whereas the sixth portion in the case of stronger menstrua contains little or no alkaloid.

Further extraction of 100 grams was made with 80 per cent. alcohol, to confirm more fully complete exhaustion of alkaloid by percolation with 250 c. cm. of menstruum.

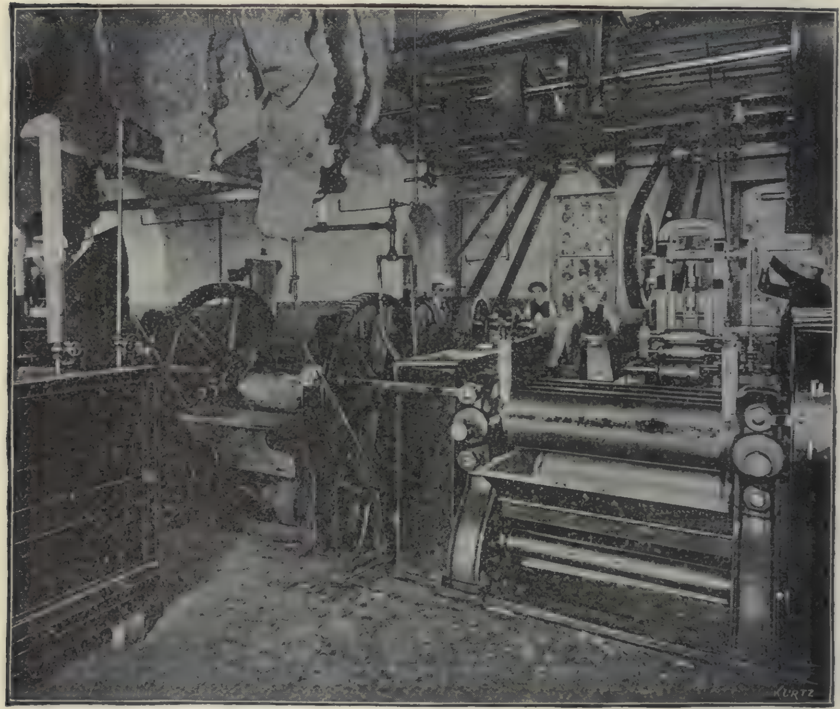
Per cent. Alcohol.	Percolate evaporated.	Yield of extract.	P. c. alkaloid in extract.
80	Total extract.	21.20	2.66
	1st 50 c.cm.	3.63	4.54
	2d 50 c.cm.	3.69	4.87
	3d 50 c.cm.	3.53	3.56
	4th 50 c.cm.	3.46	2.00
	5th 50 c.cm.	3.18	0.46
	6th 50 c.cm.	2.20	. .
	7th 50 c.cm.	1.51	. .

It will be noticed that this table shows a lower yield and stronger extract than the 16-ton average, and that it indicates a strength for the rhizome below the average 0.56 against 0.59 per cent. In this special work the extracts were dried to practically a constant weight, whereas the extract as manufactured retains about 4 per cent. of moisture. This accounts in part for the difference, and the rest may be fairly charged to the sample being a little below the average strength. Speaking of moisture retained in the extract, we may note here that five samples of extract belladonna root obtained from leading manufacturers showed respectively 9.3, 10.0, 15.0, 9.4 and 6.5 per cent. moisture.

OTHER INGREDIENTS.

Important constituents of the mass are rubber, olibanum, pitch, etc. The rubber (Para), imported from Brazil in cases averaging about 330 pounds, appears in flattened rounded cakes weighing from 5 to 50 pounds. These are made up of concentric layers formed by the natives in coagulating the caoutchouc sap on shovel-like implements in the smoking process.* This rubber before use in the plaster mass is soaked and steamed, then passed through spirally corrugated iron rolls under a stream of water until well cleansed. The resulting crinkled sheets are hung up to dry, and then worked to a perfectly homogeneous mass on warm smooth calender mills. The steaming tank, washing mill, grinding calenders, and some sheets of washed rubber are shown in Fig. 4. Olibanum, or frankincense, imported in cases weighing about 260 pounds and appearing in tears of from ¼ to ¾ inch diameter, is prepared for use by stamping and sifting. The pitch and other resinous matter are purified by melting and straining.

FIG. 4.



Rubber Mills.

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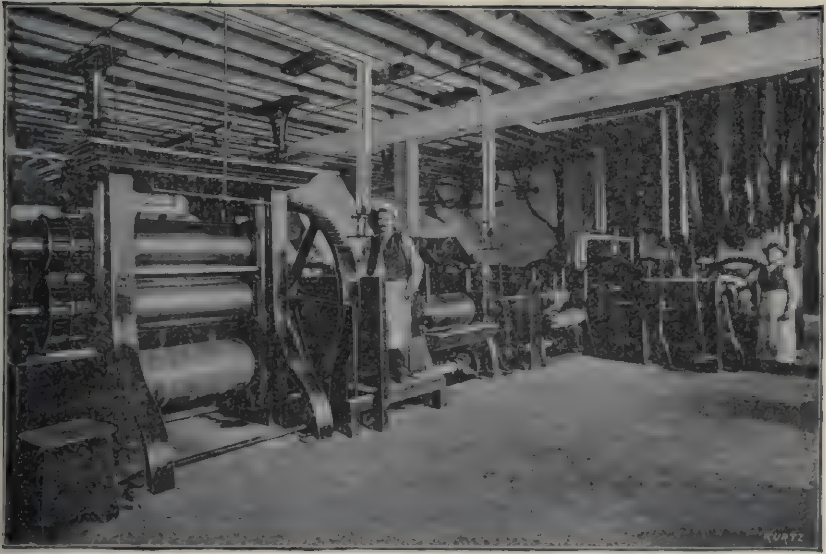
* An illustrated article on India rubber collecting appears in the American Druggist for December, 1889.

MANUFACTURE OF THE PLASTER.

The rubber, resins and other ingredients are worked with the extract to a uniform mass on warm calender mills, shown in Fig. 5. No solvent is employed, the force of iron rolls doing the entire work. Experiments with benzin as a solvent for rubber, in the early history of manufactured plasters, were most unsatisfactory, the rubber, so to speak, never being itself again after solution. When perfectly mixed and of just the right temperature the mass is spread on cloth by means of heavy calenders, such as appear at the left of Fig. 5. The cloth, usually about 120 yards by 36 inches, is fed through the calenders, and passing under the lower roll is connected with a large reel behind the machine. The calenders, being guaged for the right thickness, are started, and the mass fed upon the cloth between guides. After standing a time on the reels, the plasters are wound on wooden drums, cut and finished. About 100,000 plasters may be spread per day on one machine. Two punching machines may be seen in the background of Fig. 4. The great advantages of the rubber combination base are its remarkable keeping qualities and permanent preservation of the incorporated medication, as well as its lasting flexibility.

FIG. 5.



Plaster Mills and Calenders.

THE COLOR.

As stated, leaf extract, often overheated in manufacture, was formerly used in making belladonna plasters. In this way a greenish black became associated with strength. When root extract displaced that from the leaf, the base was darkened with inert color to avoid popular misapprehension. The plasters were better and the base practically the same. From a commercial standpoint a retention of the established color was demanded, while this concession to popular prejudice in no way impaired the medicinal value of the plaster. A dark color, then, is no indication whatever of strength. Extract of belladonna root, concentrated at the lowest possible temperature, as it should be, and used in proportion for one-half per cent. alkaloid, will give a reddish-brown plaster. Samples of strictly U. S. P. belladonna plaster, and rubber combination plaster of the natural color, are herewith submitted.

VARIATIONS.

An English firm has put on the market what they term "Emplastrum Belladonnæ Fluidum." Examination of this preparation showed it to consist of leaf extract (presumably prepared with ethereal menstruum, alkaline with ammonia) incorporated with collodion. Its specific gravity was 0.86, and on evaporation it left about 11 per cent. solid. On assay it yielded 0.22 per cent. alkaloid calculated on the original fluid, or 2 per cent. if based on the dried film. As the medication is doubtless closely bound by the film, the strength of the application is probably much less than would at first be supposed.

A more readily absorbable base has been proposed, consisting of glue, glycerin and an alkaline sulphoricinoleate. Belladonna plaster prepared with this base is flexible, and may be applied by moistening after the manner of court plaster. This combination would seem to be safer, however, if prepared with glue (or better, pure gelatin and isinglass), and glycerin without the sulphoricinoleate. The eminent authority, Professor Kobert,* of Dorpat, strongly discourages the use of solvines generally on account of the injurious effect of the combined sulphoricinoleic acid upon the blood.

Among other innovations may be mentioned the use of vulcanized oil and varieties of asphaltum by some manufacturers as cheap substitutes for rubber, wholly or in part, and the further cheapening of the mass by other substitutions.

THE ACTIVE PRINCIPLE.

The constituent upon which the activity of belladonna plaster depends is mydriatic alkaloid, having the ultimate formula $C_{16}H_{23}NO_3$. In the valuation of plasters it has usually been calculated as atropine ; but it is doubtless very largely its isomer hyoscyamine. Hyoscine, another isomer and belladonnine, may occur in small proportion.

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* Phar. Zeit., 1881, s. 22; Chemiker Zeitung, 1889, p. 1689; Arbeiten des Pharmakologischen Institutes zu Dorpat (Prof. R. Kobert), Stuttgart, Ferdinand Enke, 1889; Therapeutische Monatshefte, 1887, No. 12.

In 1887 Profs. Ernst Schmidt and W. Will, stated that hyoscyamine was very easily converted into atropine. Experiments* on belladonna, conducted at Shering's factory, showed that "one and the same root yielded the more hyoscyamine and the less atropine, the more carefully the process was conducted." In fact, it has been ascertained that if the process is carried out to perfection "belladonna yields only hyoscyamine and no atropine at all." It is therefore clear that the alkaloids of Belladonna scopolia and Atropa belladonna are practically identical. Hyoscyamine has been shown to be rapidly converted into atropine by the action of fixed alkalies and slowly by ammonia. Melting also effects the change. Prof. Schmidt has also shown† that, in belladonna roots of one year's growth, atropine occurs with hyoscyamine, while only the latter alkaloid is present in fresh old roots. He considers the commercial preparations sold as atropine and hyoscyamine usually mixtures. Atropine, pure, heavy, melting point 115° C., is listed at about 30 cents per gram, while pure hyoscyamine in very light crystalline white powder is quoted at $5 per gram. The appearance of $C_{17}H_{23}NO_3$ as atropine and as hyoscyamine is very different. While Atropine Hyde is sometimes admittedly guilty of murder in the first degree, in commenting on a recent poisoning case involving his *alter ego*, a friendly therapeutic expert declared he had never heard of Hyoscyamine Jekyll doing anything of the kind.

The isomeric mydriatic alkaloids may be separated by conversion into aurochlorides‡ and fractional crystallization, and may also be distinguished by differences in melting point§ and by their action on polarized light.‖

Recently we were quite interested in a sample of pure atropine which showed a greater power than usual for combining with Mayer's reagent, giving a factor of 0.011 against 0.012. The only thing that throws any light upon a possible cause for this variation is a statement of the eminent authority Ladenberg¶ to the effect that the supposed optically inactive atropine is made up of two alkaloids, one turning the plane of polarized light to the left, the other to the right. He endeavors to account for the optical inactivity of atropine by presuming that these two atropines have in the process of their development always been in the proportion to neutralize their respective levo- and dextro-rotary powers. The occurrence of one of these in excess, which caused a sample of atropine to be condemned for activity with polarized light, led to investigations which are developing his theory.

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* Pharm. Zeit., September 25, 1889, p. 583. Am. Drug., 1890, p. 6.

† Am. Druggist, August, 1888, p. 141. Proceedings A. P. A., 1889, p. 441.

‡ Prescott's Organic Analysis.

§ Pharm. Journ. and Trans., December 14, 1889.

‖ Am. Drug., 1888, p. 213.

¶ Berichte, 1889, 2, p. 2590.

SIMPLE TESTS.

The simplest test of any value which can be applied to a belladonna plaster is the extraction of alkaloid and application of a drop of high dilution to the eye. Dr. Squibb[*] places the limit of mydriatic power at 1 to 91,000 for atropine sulphate, equivalent to about 1 to 106,000, based on weight of pure alkaloid. In preparing this dilution the mass should be thoroughly disintegrated to admit of the solvent coming in contact with the alkaloid. Treat 4 grains of plaster mass with 1 dram of chloroform, and when entirely disintegrated shake violently several times with 1 dram of 2 per cent. sulphuric acid. Dilute with 2 ounces 1 dram of distilled water and shake again. Reserve one-half and dilute the other half with an equal volume of water. Granting the mass to be one-half per cent. alkaloid, the first dilution represents 1 to 50,000, and the second 1 to 100,000. One drop of the highest dilution introduced into the eye should show a marked dilatation of the pupil in about one hour. If second dilution fails, try the first. The chloroform taken up by the water smarts the eye for an instant, but does not seem to interfere with the test. However, this may be obviated by gently heating a definite portion until odor of chloroform disappears, and exactly restoring any loss due to evaporation. In our experience this physiological test, while the best qualitative indication of mydriatic alkaloid, varies too much with different persons to be more than very roughly quantitative.

THE "BENZINE" FALLACY.

A comparative test of strength has been proposed, which consists in simply treating pieces of the plasters with benzine (benzin) and comparing colors of resulting solutions. A brownish coloration is claimed to indicate the presence of extract of belladonna root, and freedom from such color the absence of extract. The absurdity of this test will be made very evident by the appended table, representing the action of benzine upon belladonna extracts of five leading manufacturers and a leading pharmacist. The extracts were shaken in test tubes with no result, the alleged solvent brought to a boil and the tubes allowed to stand corked indefinitely:

Manufacturer.	Appearance of benzine after prolonged contact and agitation with pure extract belladonna.
Parke, Davis & Co.	Not a trace of color.
Lazelle, Dalley & Co.	" " "
W. H. Schieffelin & Co.	" " "
Sharp & Dohme	" " "
Lehn & Fink	" " "
S. A. D. Sheppard	" " "

This test, applied to a plaster known to contain one-half per cent. alkaloid and from 21 to 24 per cent. of extract, gave practically no color resembling a solution of extract belladonna root. A plaster, however, experimentally prepared by the writer to meet this test, with asphaltum substituted for extract of belladonna, gave a far better showing for belladonna extract than we have ever seen exhibited, although there was positively not a trace of extract present. Obviously any color yielded to benzine by belladonna plasters is due not to extract, but to other constituents of the mass. The test affords food for thought in several directions.

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[*] Ephemeris, 2, 855. Prescott's Organic Analysis, p. 346.

THE ALCOHOL TEST.

Another comparative test has been widely distributed, which directs that 2 inches square of the plaster be cut in strips and allowed to stand in 2 ounces 80 p. c. alcohol, for 72 hours, with occasional shaking. A comparison of the color of resulting solutions is claimed to show the relative proportion of belladonna extract in the plaster. A few facts should be considered in connection with this childlike proposition. Should a plaster manufacturer use extract prepared with 94 per cent. alcohol, in proper proportion, the plaster would have less coloring matter to yield than an equivalent proportion of extract made with 80 per cent. alcohol. Rubber in combination resists the action of alcohol more than some cheaper substitutes. Anything in the mass giving a yellow or brownish solution with alcohol, as pitch, dark resinous matter, etc., will influence this test. The possible substitutions for extract which would give this brownish coloration are almost innumerable. The absence of color is presumptive evidence that little or no extract is present; but as rubber combination mass yields so slowly to the action of alcohol, an assay should be made, or at least the physiological test applied. The production of a brown color means simply that there may be extract and there may not. The plasters considered most particularly in this paper give a yellowish brown solution by this method, but the test is, at best, merely a negative one, and a poor one at that. Strictly U. S. P. belladonna plaster yields little color to 80 per cent. alcohol.

ASSAY PROCESSES.

Methods for the valuation of belladonna plasters may be based upon the following facts: The mass generally consists of extract, rubber, resins, gum resins, etc. The active principle is alkaloid, which when free is soluble in chloroform, alcohol, ether and benzol, and insoluble in water. When combined with an acid, as a salt, it is soluble in water and alcohol, but insoluble in chloroform. Mayer's reagent—a solution of potassium mercuric iodide—combines in practically definite proportion with the alkaloid of belladonna. It is prepared by dissolving 13.546 grams of mercuric chloride in a solution of 49.8 grams of potassium iodide in about 800 c. cm. of distilled water, and diluting to exactly 1000 c. cm. Repeated titrations of solutions of Merck's pure atropine, from 1 to 300 to 1 to 400 dilution, showed that 1 c. cm. will precipitate 0.012 grams, and nearly the same quantity of hyoscyamine (0.0117). Dr. E. R. Squibb places the limit of the mydriatic power of belladonna alkaloid at one drop of a dilution of 1 to about 91,000 for sulphate, equivalent to about 1 to 106,000 for free alkaloid. Vitali's qualitative reaction is obtained by adding to alkaloidal residue upon evaporation a few drops of fuming nitric acid, heating on steam bath to dryness and adding, when cool, a drop or two of an alcoholic solution of potassium hydrate—violet coloration.

Process 1. Accurately weigh one or two plasters, cut in strips, remove mass from cloth with as little warm chloroform as will answer, transfer chloroform mixture to a globe separatory funnel, turn upon the cloth an equal volume of 2½ per cent. sulphuric acid, transfer to separator, shake carefully with chloroform mixture, and allow liquids to separate several times. The chloroform mechanically carries the alkaloid, presumably as a salt, from the cloth to the separator, where the acid water, on agitation, takes it into solution. The chloroform mixture is run off and the water filtered into another separator. The chloroform is returned to separator and extracted with small portions of acid water, until a little gives no reaction for alkaloid. The cloth is dried and weighed. The filtered acid water solution is washed with chloroform. It is then made alkaline with ammonia and extracted with chloroform, by careful agitation, until a portion fails to give reaction for alkaloid when evaporated, dissolved in acid water and tested with Mayer's reagent. The chloroform extract, washed by agitation with distilled water, is drawn off and distilled or evaporated. The alkaloidal residue may be dissolved in about 350 times its weight of acidulated water and titrated direct with Mayer's solution, or it may be purified by softening with a drop or two of chloroform, taking up with warm stronger ether and filtering into tared beaker, when it may be evaporated and dried to constant weight. This residue may be dissolved in just 300 times its weight of 2½ per cent. sulphuric acid, one-half titrated with Mayer's reagent, a little of the remainder (best made alkaline with ammonia and extracted with chloroform) evaporated for Vitali's test, and 1 c.cm. diluted to 350 c.cm. for physiological test. By this method a plaster standardized to one-half per cent. alkaloid assayed 0.495 per cent. by direct titration. Another plaster, 0.52 per cent. by weight of impure alkaloid, which in dilution of 1 to 109,500 (1 c.cm. 1 to 300 solution to 365 c.cm.) caused dilatation of the pupil within 45 minutes in three persons, a drop having been introduced into the eye of each.

The process would be theoretically more perfect if, in the first step after removing the mass with chloroform, the mixture were introduced into the separator after the cloth had been washed with chloroform alkaline with ammonia, and the washing liquid shaken with the acid water, the cloth not being treated with water. The one difficulty with this process is the formation of emulsions by shaking, which seriously embarrass the operation. These emulsions may be evaporated and residue taken up with alkaline chloroform.

The process in its essential features accords with directions given by Dr. A. B. Prescott, in his work on Organic Analysis. There the first chloroform is made alkaline with ammonia, and absolute alcohol used to purify the final residue.

Process 2. The writer has found it possible to avoid trouble with emulsions by the following method: Remove mass from cloth with chloroform alkaline with ammonia and precipitate rubber with alcohol (94 per cent.); drain off the liquid, soften the mass with a little chloroform and again precipitate with alcohol, and repeat operation if necessary to prevent occlusion of alkaloid by the rubber in the precipitation. Unite the liquid extracts and evaporate on a little acid washed sand, not quite to dryness. Extract sand by rubbing up with two and a half per cent. sulphuric acid, until a check test shows the sand to retain no alkaloid. Sand is used to prevent occlusion by resinous matter. The acid water extract is filtered and washed with chloroform. It is then rendered alkaline with ammonia, extracted with chloroform and further treated as in first process. In an assay by this process the alkaloidal residue purified with ether calculated 0.53 per cent. The alkaloid, though failing to fully titrate up to weight, with Mayer's reagent, showed a marked mydriatic effect in dilution of 1 to 108,000, one drop dilating the pupil in 40 minutes in one case, and one hour in another. In experiments made with a view to abbreviating the process, in point of time, Mr. C. E. Parker found that after precipitating the rubber with alcohol from the alkaline chloroform extract, the chloroform largely thrown out by direct addition of distilled water retained most of the alkaloid, and that by shaking the mixture with alkaline chloroform the alkaloid could be completely extracted, despite the carrying of some chloroform into the water by the alcohol.

The writer finds this abbreviation of the process a very practical improvement.

Process 3. Take two plasters, accurately weigh and digest in 100 c.cm. warm chloroform, alkaline with ammonia. Drain the mixture from cloth, precipitate rubber with 50 c.cm. of alcohol (94 per cent.) and drain off liquid into a separatory funnel, shake with 150 c.cm. of distilled water, and draw off chloroform into another separator. Treat the cloth with 50 c.cm. alkaline chloroform, washing off the remaining mass, and with this mixture soften residual mass of rubber and gummy matter. Precipitate rubber again with 25 c.cm. alcohol. Shake liquid with the water mixture in first separator, and draw off chloroform into the second. Repeat softening and precipitation of mass, if necessary, with 25 c.cm. chloroform and 12 c.cm. alcohol, and pass liquid through first separator as before; further extract liquid in first separator with alkaline chloroform, if necessary, and draw off into second. The chloroform in second separator is then extracted with acid water, and that, washed with chloroform and afterward made alkaline, is extracted with chloroform and proceeded with as in other processes. In an assay by this process an attempt was made to purify the residue by softening with chloroform, taking up with warm benzol, extracting with acid water, making alkaline, extracting with chloroform and evaporating the chloroform, after washing with distilled water, in a tared beaker. Dried to constant weight, the alkaloid weighed 0.1105 grams, and calculated 0.478 per cent., showing a loss by purification. This residue was dissolved in 33.15 c.cm. of 2½ per cent. sulphuric acid. An exact cubic centimetre of this 1 to 300 solution was diluted to 435 c. cm. with distilled water and well shaken. This dilution of 1 to 130,500 was tried upon the eyes of eight persons, one drop being used in each case. A dilatation was noted in each individual within 50 minutes. Scrupulous care was taken to avoid any contact with apparatus not perfectly clean. The remarkable activity, in some cases, indicated that the limit of dilution had not been reached. Dragendorff's limit, it may be noted, is 1 to 130,000 for atropine. This alkaloid was from Belladonna scopolia, and would appear physiologically rather more active than that from Atropa belladonna, if there be any difference. This process, by direct titration with Mayer's solution, gave practically 0.50 per cent. alkaloid with plasters of same strength.

In the writer's experience volumetric work with Mayer's solution, when conducted under the same conditions used in establishing the factor from pure alkaloid, gives results which compare most favorably with gravimetric work in point of accuracy, and much more than favorably in the matter of time.

In working with Mayer's reagent shake the solution violently, after each addition of solution, in flask provided with tight rubber stopper. Toward the end of the process the solution will generally clear, so filtration is unnecessary.

In gravimetric work the perfect purification of the alkaloid without loss is a difficult matter.

In calculating results of volumetric work, the number of cubic centimeters of Mayer's reagent × by 0.012 × 100 ÷ by (weight of plaster—weight of cloth) gives percentage of alkaloid in mass. In gravimetric work the weight of alkaloid × 100 ÷ by net weight of mass gives percentage.

Absolute accuracy is not claimed for these processes, but they are capable of showing the strength within about one-fiftieth per cent. alkaloid. Standardization within this narrow limit surely merits the name, in view of no Pharmacopœial standard other than that of a widely varying root.

The writer is indebted to Charles E. Parker, Ph. C., for valuable assistance in the work involved by this paper.

MR. PATCH.—I would like to ask Mr. Williams whether he has found a correspondence between the gravimetric and the volumetric methods of assaying these drugs, such as belladonna, stramonium and hyoscyamus?

MR. WILLIAMS.—I think that volumetric work is more satisfactory than analytical results based on a factor established through gravimetric methods. I am well aware that estimations by Mayer's solution are not considered very close by the best analysts; but I am also well aware that in making gravimetric estimations the alkaloid is not obtained in a condition pure enough for accurate weighing. In the paper, under the head ot Assays, you will find this subject treated very fully, and the results given.

As a rule, taking a plaster having a half per cent. of alkaloid, for instance, I have found in volumetric work that I obtained something like 0.495 per cent., while I had actually used 0.500 per cent. In my experience the gravimetric processes gave an alkaloid which is not absolutely pure unless great care is taken.

MR. PATCH.—I asked the question, because our experience was that if we dissolve the alkaloid obtained by gravimetric estimation, titration with Mayer's solution always gives a higher result. For instance, we may find a gain of from 40 to 50 per cent., estimating with Mayer's, over and above what the gravimetric estimation gives. I give my experience, and I wish to know where the fault was, whether it was in the method of conducting the work or whether it occurred in the factor employed?

Our titration by Mayer's solution was always higher, so we have been in the habit of estimating both gravimetrically and volumetrically.

MR. WILLIAMS.—My experience has been that the same residue after titration nearly agreed. But I think the whole solution of the question is in the factor employed. We use twelve milligrammes for each cubic centimetre of Mayer's solution. Mayer's original factor was one hundred and forty-two milligrammes. If that were employed it would make a considerable difference. I would ask Professor Patch if he determined his own factors or used those already established?

MR. PATCH.—We have taken the mean of published factors as given in Lyon's work on assaying, and Prescott's Organic Analysis, which is fourteen milligrammes for each cubic centimetre, if I remember right.

A paper on Adulterations of Oil of Rose, by D. L. Haigh, was read :*

MR. HEINITSH.—I would ask if the writer knows how long ginger grass has been used?

MR. HAIGH.—As far back as I have been able to find any literature on the subject, statements are found that ginger grass is one of the oldest adulterants, and as being obtained from India, whence it is imported into Constantinople in large quantities. I understand it was the main adulterant used in the past, but copaiba seems to be the adulterant chiefly employed at the present day. It has never been adulterated in this country, however, and if you obtain the oil in the original cans you can get it as pure as it is brought here.

MR. HEINITSH.—Some years ago it was said that a house in the eastern part of Pennsylvania manufactured more oil of rose than any other house in the country; they always had two bottles in their window that no one in the store or about the premises was allowed to touch. It is probable that it was the very mixture you have mentioned, because it was kept in direct sunlight.

MR. HAIGH.—I have never found spermaceti as an adulterant, and Mr. Snow, of Detroit, some time ago stated that he had sought for spermaceti in the oil, and had been unable to find it, but that he had found in the German oil a large percentage of stearopten.

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* This paper had not been received by the Secretary, November 3, when this portion of the Proceedings passed through the press.

MR. LLOYD.—In connection with this paper I would ask Professor Patch a question. In going through the Boston College of Pharmacy a few days ago, in their cabinet, which was very interesting, I observed a specimen of stearopten from oil of rose. It had an odor distinct from the attar of rose, though it resembled it. I would ask Professor Patch to what that peculiar odor was due, if it was owing to some adulterant mixed with the attar of rose?

MR. PATCH.—If, as this gentleman has stated, all the oils are adulterated, I don't know how we can fix a standard upon which we can rely, or how we can cultivate our sense of smell so as to determine this, especially when we know that ginger grass and other adulterants are mixed with the oil of rose in such a proportion as to be with difficulty separated. The compound which has been referred to, is the stearopten obtained from a sample of German oil (Schimmel's) by fractioning, and is not supposed to be adulterated. We have taken a number of samples of oil of rose, and we would not assume to say they were adulterated, but would say that by fractioning upon a piece of paper destitute of odor, Schimmel's oil of rose gave the finest and clearest rose odors, and these tests were not made by depending upon the olfactory sense of one person, but by submitting it to the judgment of a number. Even then, as stated, we may be in the dark, because we cannot say that we have an absolutely pure sample, but I am inclined to think that Schimmel & Co. would not put up an oil of rose, and guarantee it as pure, when it was not what they represented it to be. We therefore assumed, that in these specimens, we had absolutely pure standards for comparison; and we use them for standards, relying on that house's reputation, who we do not think would risk their business interests and reputation as accurate manufacturers by submitting a sample of adulterated oil as a standard for comparison.

MR. HAIGH.—In my reference to Schimmel & Co., I should have stated that I had a letter from them, and they did not claim for their oil that it was absolutely pure. They are not the direct manufacturers, and that is where the trouble comes in. There are only a few of the manufacturers represented in the Kezanlik district, where the Bulgarian or Turkish rose oils are produced, and I wrote specially to get a standard oil from Messrs. Fritzsche Brothers, who are Schimmel's American agents. They wrote that they could not say whether the oil was pure, but they guaranteed it to be free from stearopten. That is as far as they vouched to me for the purity of the oil which they sent. They only charge for this oil at the wholesale price something like $6 an ounce, while the French oil costs $18 or $20 an ounce. The regular oil is actually worth less than the oil freed from the stearopten.

MR. SIMMON.—Has Mr. Haigh made any examination of the oil made from roses grown in Germany? There have been, in the last few years, great efforts made in the culture of roses, to manufacture a pure oil there, and they reported last year that they had on hand 125 ounces, which surpassed in quality any exported oils. It would be a good idea for the manufacturers to put such goods on the market, as absolutely pure.

MR. HAIGH.—I have not. It is certainly of interest to know that they have begun the culture of the rose for rose oil in that country. It is claimed that the German oil contains 60 per cent. of stearopten; that the oil made in northern countries contains a greater percentage of stearopten, and that the white rose contains a greater proportion of stearopten than the red. It is also stated that in making the lower grades of oil they mix a larger proportion of the white rose leaves than in making the finer grades. I use between five hundred to a thousand ounces of oil every year, and I know that the German manufacturers produce more than 125 ounces of oil of rose in a year.

MR. SIMMON.—They claim they make a much finer oil, and others claim that the German oil is not so good. I want to know if you have made tests of it.

Mr. Haigh.—I have had samples of Schimmel's oil, which is a German oil, but as I have said there is no real test; and that is the reason I would not say anything against any oil, because we have no standard to go by. I test oil of rose for the substances I have referred to, ginger grass, copaiba, etc. If I could get a pure oil of rose to mix these in, then I would be able to detect them. But what are you going to do when you cannot tell whether the oil you have is pure, when it does not conform with any of the tests given by authorities? You must have a standard.

Mr. Lloyd.—What is the probable percentage of adulteration in the commercial oil of rose?

Mr. Haigh.—We have no means of ascertaining. I meet all the representatives of the oil houses, and while in New York I have visited most of the houses there. Whenever I asked them which is the best oil on the American market, they would say "So and so's is a good oil"—that is all they would acknowledge to me—"and if any oil that comes to America is pure, that is—but we have an oil to sell, which will answer your purpose just as well." Now all I claim is this: I have got an oil that suits my purpose, but I have no doubt it is adulterated, and other people get oil entirely different from that. But whenever you establish an oil in any class of business you want to always have the same odor; whether it is adulterated or not, you want to keep that oil. That is what we require to suit our trade.

Mr. Lloyd.—In the cabinet of which I spoke there was a sample labeled "Stearopten from Oil of Rose," which had a different odor from oil of rose.

Mr. Patch.—That is due to change in fractioning, and nothing else. I suppose that the oil, freed from stearopten, would have a different odor.

Mr. Lloyd.—In other words, it is questionable whether attar of rose is uniform in composition.

Mr. Patch.—We should not judge oil of rose from either of its constituents when separated or when recombined. We must have an absolutely pure native oil obtained by direct distillation of the rose petals, and if we have none I don't know how we can tell. I would assume, however, that a house like Schimmel's, furnishing a sample, would have all three, stearopten, elœopten, and the pure oil of rose, indicated on the labels.

Mr. Ebert.—About a year ago, a prominent wholesale drug house of this country assured me that they had a superior brand of attar of rose, and suggested, as I was about to make some perfumery, that I should try it. A sample was shown me, which seemed, by using the ordinary test of smelling, to be very fragrant. I decided to buy an original package of it. I first used it in making rose water, and subsequently for a perfume of White Rose that we make after a certain formula. After a very short time we received a number of complaints that it was not lasting. On looking into the matter, and comparing it with a sample of rose perfume previously made, I found that it was very deficient in strength, and in comparing the oil with Ihmsen's oil obtained immediately afterwards, I found there was no comparison at all between the one and the other, the latter far surpassing it in strength. I returned it to the house, and they wrote me a harsh letter, claiming that I was mistaken, that the oil had been sold to many leading houses, and that they never had had any complaint. Finally, I went to New York—it came from a New York house—and, in talking with the head of the firm, not the writer of the letter, he admitted that I was not the only one who had complained; that a number of others had returned this particular brand of rose oil, and had found the same objection to it that I had. I do not remember just now what the brand was, but it had come from a well known New York house.

Mr. Barnum presented the following paper, and illustrated the process by exhibiting a sketch of the apparatus.

UTILIZATION OF THE SODA PRODUCTS OF KENTUCKY.

BY J. P. BARNUM.

For some time past I have been interested in perfecting a method by means of which the soda products of Kentucky can be utilized, and the advantages afforded by the location improved to a very full extent. Such advantages and such a combination of material exist nowhere else in the world to my knowledge. Thinking that a description of the location, process and methods employed would be of interest to the members of the Association (as applications have been frequently made to me by members for such information), I submit the following in order to save time by answering these questions at once, as well as to furnish a paper that will probably be of interest to others.

The materials required are carbonate of lime, salt water, ammonia, water suitable for boiler purposes, and fuel. All of these exist naturally in this region except ammonia, which is only used as a vehicle for the transformation of the old combinations into the new one. Theoretically, all of the ammonia is recovered, but practically a loss of from one to five per cent. is sustained in the process. In my own experience in using ammonia in large quantities, for this and similar purposes, the loss, barring accidents, has been kept down to the lower figure named. One of the great advantages of this region is the juxtaposition of all materials. Take for example the Moorman well, which is a type for all. This salt well is situated in a narrow valley, some five hundred feet from a ledge of rock that shows by analysis 98 per cent. of carbonate of lime, and rising to a height of over one hundred feet. By placing the lime kilns required at the foot of the ledge, the rock can be quarried at a proper height and passed into the opening in the kiln without the labor of raising or lowering material. A fine stream of water runs along the base suitable for boiler purposes, while at a little distance the well is throwing up a stream of salt water, when not confined, of 10° Baumé to a height of 80 feet, by the pressure of the natural gas contained in it; while on the other side of the valley a gentle slope, rising to about 80 feet, affords an admirable site for the location of the various parts of the soda works, so that most of the labor could be done by force of gravitation. For the past twenty-six years salt has been manufactured here practically in this way, the gas and salt water being conducted to the top of the hill, separated by a gasometer, the liquid boiled with a portion of the separated gas, for the purpose of driving off the carbonic acid contained and separating the carbonates of iron, lime and magnesia, then flowing into pans slightly lower—settled, and finally the clear liquid is drawn off and evaporated for salt, the only labor employed being that necessary to take the salt out of the evaporating pan after it is formed, and the services of a watchman to protect the buildings. Only a small portion of the gas is used for this purpose, the balance being allowed to go to waste.

Shipping facilities are excellent; the L., St. L. & T. R. R. goes directly through the field, while the Ohio River is at no place farther than a mile distant from the wells. In all the wells thus far discovered there has been an abundance of natural gas to furnish the fuel required for these manipulations. In most instances the water is under sufficient pressure to raise it to a height so that the operation can be carried on as previously indicated, by force of gravitation. The lime and salt water existing in large quantities, the cost of the manufacture of soda ash is confined to the loss of ammonia, the interest of the money expended on the plant, the cost of labor, and the necessary expenses of doing the business.

The following is an analysis of the lime rock:

Silicates	3.220
Oxide of Lime	2.230
Oxide of Iron	.140
Carbonate of Lime	94.026
Oxide of Magnesia	3.840

Analysis of Salt Water.

Silicates	1.452
Oxide of Lime, with traces of Oxide of Iron	.874
Magnesium Chloride	.526
Aluminum Chloride	1.674
Calcium Chloride, with slight amounts of Barium and Strontium	10.338
Chloride Lithium	.280
Bromine	.124
Iodine	trace.
Sodium Chloride	107.699
(The above in one litre.)	

Analysis of Gas.

Carbonic Acid	3.7
Ammonia	none.
Sulphuretted Hydrogen	.1
Bisulphide Carbon	trace.
Illuminating Gas	1.1
Air	10.0
Light Carburetted Hydrogen or Marsh Gas	85.0
Carbonic Oxide	.1

As the gas had been kept in a rubber sack, the ten per cent. of air was probably not in the gas when it came from the well. The estimated amount of gas furnished every twenty-four hours is 1,130,068 cubic feet.

By my process the water and gas are conducted from the well by pipes to a gasometer at a considerable height above, passing through the cooling tank on their way upward. The gas and salt water are separated; the water runs into a boiler where the combined carbonic acid is driven off by means of heat generated by a portion of the gas separated; then run off into settling tanks, where the decomposed carbonates of iron, lime and magnesia are deposited. The clear brine is then transferred to an evaporator, where it is concentrated to point of saturation. The saturated liquid is then run into the cooler before mentioned, where it is reduced to the same temperature as the water in the gasometer. It is finally siphoned over into a tank, where it is cooled by means of ammonia coils passing through to as nearly as possible a freezing point. The cool liquid is then run to a rotary cylinder, where it is charged with ammonia by means of a force pump, and with carbonic acid from the carbonic acid receiver, under considerable pressure. By appropriate connections this pump may be used for both purposes. The decomposition of the salt water takes place at once, the ammonia uniting with the chlorine and the carbonic acid with the soda forming bicarbonate of soda. The mixture is then transferred to a cylinder where, if any uncombined salt remains, it is again charged with the gas until no traces of salt remain. If necessary, a third cylinder is provided where the same process can be repeated. These cylinders are usually arranged so as to revolve in one direction, while the shafts contained in them revolve in the contrary direction, securing a thorough admixture of the liquid and gases. The excess of gas is drawn off through openings and carried back to the receivers, where it can be used for another process, while the bicarbonate of soda and chloride of ammonium are emptied into a settling pan, allowed to subside, the chloride of ammonium drawn off into a pan and concentrated, then run into the ammonia boiler, which has already been filled with oxide of lime and the chloride of ammonium decomposed, the ammonia passing off to the ammonia receiver, from which it is condensed by the ammonia pump, and again used for cooling and combining with the chlorine. The soda is then drawn off into the agitator, where it is washed with a solution of soda or clear water. It is then passed into a pan with a false drainer, and finally into centrifugal dryer; it being rotated rapidly, drives off all the surplus liquid. The bicarbonate of soda is then transferred to roasting ovens, where it is either dried sufficiently to be used as bicarbonate of soda, or if soda ash is required, one equivalent of carbonic acid is driven off and conducted up to the carbonic acid receiver, to be again used. The carbonic acid is derived from lime kilns.

The advantages of my process over the Solvay or any other ever devised, are:

1st. The very thorough and rapid admixture of the brine and gases by the means of the rotary cylinders which move in one direction, while the shaft contained therein moves in the opposite.

2d. The carrying on of this process under considerable pressure, by which means the combination is more thoroughly effected than it otherwise could be, and the decomposition of all the salt and the changing of same into the bicarbonate of soda is insured by having an excess of gases at the end of the process, which are drawn off and saved for succeeding work.

3d. The very great saving of time in the operation. Practical demonstrations have shown that the same results can be effected within thirty minutes by means of these cylinders which would require several hours to accomplish under the system of towers, depending on the spraying down of the salt water and the mixture of the gases ascending through the column. Besides, not unfrequently portions of chloride of sodium remain unchanged and mix with the finished bicarbonate of soda.

4th. By the constant agitation of the liquid in the cylinders, no precipitates on the sides of the apparatus will be formed, and all the soda produced will be emptied into the tank for washing and separating. Under the Solvay process, and in fact all processes, depending on upright towers where the stream is broken by diaphragms, the small openings are likely to become coated with deposited bicarbonate of soda, requiring much time and labor to remove it. In working the similar towers for making bisulphide of lime, soda and magnesia, fully one-fifth of the time was lost in keeping the towers clear from these deposits; the entire inner surface requiring cleaning out at least weekly, and sometimes the whole process was stopped by these deposits during the week.

5th.—The cooling of the liquid by means of the ammonia coils, so that the process in the boilers may be carried on at a low temperature.

6th.—The device for rapidly emptying contents of one cylinder into the other by means of flexible rubber valves, and other devices connected therewith.

In the Brandenburg region, as before mentioned, we have an immediate proximity of all the elements entering into the soda compounds. Contracts can be made for the use of these wells, gas and lime rock at a nominal cost, furnishing practically free material. With the salt water under sufficient pressure to raise it to a height so that most of the labor can be performed by force of gravitation, I see no reason why soda ash cannot be produced at a profit, at less than one-half the present rates. The cost really amounts, as before stated, to the interest on the plant, the wear and tear of machinery, labor employed, and the cost of doing the business. Under these circumstances I do not think soda ash can be produced elsewhere as cheaply, and there need be no fear of competition. My experiments all show that the cost of production is very little, if any greater, than the cost of the freight from the seaboard to the Ohio.

I have not mentioned the by-product of chloride of calcium—the chlorine from this can be utilized in making bleaching powder, and a second residuum of sulphate of lime, which while not sufficiently clear to be used as plaster of Paris, could be used as a fertilizer, and a considerable portion used in plate-glass manufacture, where it is required for bedding plates previous to grinding. In fact, nothing but the water contained need be lost.

Mr. Simmon.—If I understand this gentleman correctly, he is about to conduct the well-known Solway process in this country. This process is protected by patents, and I suppose he or the parties he represents have secured the patent rights. I fail to see any new features, except the special advantages of this locality.

Mr. Barnum.—The patenting of the Solvay process is impossible. In that process a column of water is allowed to spray down, while the gas is forced up from below. I worked on that plan for something like four years, and found that with the revolving cylinders, work could be done in something like thirty minutes, which took twelve hours with the Solvay process. This process is entirely protected by patents, and the Solvay people do not offer any protest to it. The gist of the whole thing lies in the cylinders revolving in one direction, while the shaft revolves in another, under pressure. The union takes place very rapidly under pressure, and the double motion of the cylinders prevents accumulation. In working with the cylinders in the Solvay process we found that in a few days the diaphragms would clog up with deposits of soda; they had to be cleaned by a man with a crow-bar, and then the whole day would be taken up in steaming out the bi-carbonate of soda. In the process described the cylinders have been in use since September, 1889, and have not required change to the present day.

The following paper was read by Mr. Hallberg.

WHAT AMOUNT OF SAND IS PRESENT IN COMMERCIAL ASAFŒTIDA?

Query No. 28.

BY W. A. PUCKNER.

In approaching this query, which appeared simple and easy, an obstacle was encountered from the absence of authoritative statements in regard to the mineral constituents of the natural substance, and I was also somewhat puzzled over the word sand itself; Webster and Worcester define the word, but not in such a way as to give the analyst any help in the determination of it. The latter states that it is composed of minute grains of stone, or small particles of quartz or other stone not cohering together. In Sach's Agricultural Chemistry it is said to consist of "loose, non-cohering grains of quartz, of quartz and feldspar, or of other minerals."

It occurs to me that a better form of the question would be directed to the proportion of ash, a fact easily determined, and which would afford, after a sufficient number of determinations had been made, a standard of comparison of some value, and which would be easy of application.

In regard to authorities on the mineral constituents of asafœtida, Pelletier is quoted in the U. S. D. as finding traces of the acid malate of calcium. Brandes finds 6.2 per cent. of calcic sulphate, 3.5 per cent. of calcic carbonate, 0.4 per cent. of oxide of iron and alumina, and 4.6 per cent. of *impurities*, consisting chiefly of sand and woody fibre. Maisch, *Proc. A. P. A.*, 1871, reports 57, 44, 15, 51 and 62 per cent. ash, consisting chiefly of $CaSO_4$, in specimens examined by him. Both the German and British

Pharmacopœias limit the ash to 10 per cent., without defining its composition.

Under these circumstances I thought it best to determine carefully the quantity and quantitative composition of the ash in the specimens at hand and disregard the query itself; hence the proper title of this communication would probably be "A Note on the Constituents of Asafœtida."

The following is the method adopted: A weighed quantity of a representative sample of the drug was dried in an air-bath until it could be reduced to a fine powder; the loss of weight was noted, and 2 or 3 grams, calculated to weight of the original sample, taken for analysis. This was first extracted with alcohol in a Soxhlet extractor, and from the requirement of the U. S. P., that 60 per cent. should be soluble in alcohol, the loss under this treatment was noted. As the substance, after extraction, was dried at 100° C. and then weighed, the figures given in this paper give the amount soluble in alcohol plus the water contained in the original sample, as I inferred that the standard of 60 per cent. refers to the air-dry substance. The residue from alcohol extraction was then slowly ignited in a shallow platinum capsule, and this residue designated as ash. The ash obtained was not a fixed quantity, as the organic matter present reduced a portion of the calcic sulphate to the sulphide. The ash was treated with hydrochloric acid and water, the residue again united and weighed as "insoluble ash." In the soluble portion alumina and iron were determined as oxides, calcium was precipitated as oxalate, dried in Gooch filter at 100° C. and calculated as $CaC_2O_4(H_2O)$, and magnesium determined as pyrophosphate. Carbonic acid was determined by the method of Rose (absorption by caustic alkali). Sulphuric acid was determined by extracting a fresh portion with alcohol, treating residue with dilute hydrochloric acid, evaporating, and treating with HCl and $KClO_3$, to destroy organic matter, then precipitating with baric chloride. The baric sulphate was separated with a Gooch filter, dried at 130°–140° C. and weighed.

	Soluble in Alcohol.	Total Ash.	Insoluble Ash, (earth, clay, sand, etc.)	Alumina and Iron.	CaO.	MgO.	SO_3.	CO_2.
No. 1 in mass	59.49	19.45	2.32	1.16	7.12	1.14	8.57	1.09
No. 2 "	27.39	56.03	1.37	.42	25.07	2.03	20.49	10.78
No. 3 powdered	44.48	38.59	2.36	.68	16.57	1.39	16.18	5.32
No. 4 "	33.47	47.86	1.95	.60	18.85	.42	23.51	2.62
No. 5 "	31.35	55.38	21.96	2.57	9.91	6.49	8.96	4.25

Silica found—not determined.

Of the two specimens of lump asafœtida, No. 1 was dark and irregular, hard and dry portions intermixed with softer parts, while No. 2, bought as of extra quality, was of a lighter color and homogeneous throughout. The former gave 19 per cent., while the latter showed 56 per cent. of ash, of which about 34 per cent was calcic sulphate and 19 per cent. calcic carbonate. Of the specimens of powdered gum, No. 3 was obtained of a Chicago drug-house, No. 4, with its 47 per cent., of ash containing 40 per cent. calcic sulphate, was purchased of a New York jobber, while No. 5, containing 55 per cent. of ash, bore the label of a drug-miller claiming it to be a *purified* gum.

Chicago College of Pharmacy.

The next paper read was on Syrup of Tolu.

SYRUP OF TOLU.

BY M. B. TRAVIS.

Query No. 63. "Syrup of Tolu, as now prepared, is regarded as an objectionable preparation. Can a more satisfactory formula be suggested?"

There has been so much said and written in reference to this syrup for some years past that it has called out comments and suggestions from many. As the formulas presented in the revision of the last two Pharmacopœias seem to be unsatisfactory, the query "Can a more satisfactory formula be suggested?" is but natural, and may lead to good results.

After various experiments with different formulas, I would present one that has proven very satisfactory.

R.	Balsam Tolu	℥ iss.
	Alcohol	℥ ii.
	Sugar, Cut Loaf	℥ xxviii.
	Water q. s.	℥ xxxii.

Digest the balsam with twelve (12) ounces of water in a well-covered vessel, on a water bath, for two hours at a low temperature, not to exceed 180° F. Pour off the liquid, and, when cold, add two (2) ounces of alcohol, shake well, let stand a while, and strain through a well-wetted muslin strainer. Then add to the syrup. Make syrup by placing sugar, after crushing some, in a percolator; add twelve (12) ounces of water, close lower end of percolator until sugar has become thoroughly saturated; then open and allow to drop through, and if sugar is not all dissolved pour on a portion of that run through, and continue the operation until sugar is dissolved.

This makes a syrup fine in appearance, delicate in flavor, and one that will keep for a long time.

By this process the acids contained in the liquids are dissolved and held in solution by the alcohol more completely than in other formulas that have been tested. It makes a syrup clear and permanent. I prepared some syrup by this process July 27th, 1886, a sample of which I still have, and it has kept perfect until the present time, retaining its flavor and appearance.

Saybrook, Ill., September 2d, 1890.

MR. HALLBERG.—This paper I think is good and practical. Much objection has been found to the present formula for syrup of tolu, perhaps more than there was to the formula of 1870. Of the two, I prefer that for 1880, although it is better adapted for the preparation of the syrup on a large scale than on a small scale. The formula proposed in this paper is a slight modification of the present officinal formula, and will enable the operator to manipulate on a small scale; and while I have not tried it, I think that it will prove a good one, if for no other reason than the fact that it requires no addition of an alkali.

The following paper was next read:

ON THE ETHEREAL OIL OF POLYGALA SPECIES.

BY HENRY C. C. MAISCH.

Although the peculiar odor of senega root was probably early noticed, Langbeck (*Beckurts' Jahresbericht für Pharmacie, Pharmakognosie und Toxicologie*, 1881–1882), is the first author I can find whose publication has direct bearing on the subject.* He states that a three-year old senega root possessed a decided odor of salicylic-acid-methyl-ester or oil of wintergreen. After distilling the root with water he estimated, by means of ferric chloride and comparison of the color thus obtained with an aqueous solution of oil of gaultheria treated in like manner, the amount of oil present to be 0.225 per cent. A twelve months old root gave a color reaction which pointed only to traces of the oil.

L. Reuter (*Archiv der Pharmacie*, 1887, 227, p. 313), estimated the characteristic constituents of Polygala Senega with the intention of basing thereon an assay of the root. He found southern senega to contain 0.28 per cent., and northern 0.25—0.33 per cent. of the ethereal oil.

The same author (*l. c.*, p. 459 and 549) gives two methods for determining the presence of oil of wintergreen in the root.

"Five gm. of the air-dried root treated with 50 cc. water of about 60° C., should after 15 minutes give a filtrate which, on acidifying with 3 drops of hydrochloric acid and extracting with 50 cc. ether, yields to this sufficient salicylic acid, so that on taking up the residue remaining after the spontaneous evaporation of the ether, with 20 cc. water of 60° C., and adding one drop of solution of ferric chloride, a distinct violet color should appear."

The second method, to which Reuter gives the preference as the sharpest is as follows:

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* The presence of a volatile principle in senega root was recognized by Peschier (1821), Feneulle (1826), Dulong (1827), Folchi (1830), and others.

"Five gm. of the air-dried and cut root are macerated with about 30 gm. ether for ½—1 hour, when the ethereal extract is filtered into a beaker containing 20 cc. water of about 40—50° C., and a dilute solution of ferric chloride added; the aqueous solution assumes a violet color, the supernatant layer of fatty oil and resin having no effect on the reaction."

On examining the false or white senega, the root of *Polygala alba*, Reuter obtained evidence of only traces of the oil, while a Japanese senega, obtained of Prof. Shimoyama and probably the root of *P. tenuifolia*, did not contain a trace of such a compound.

Through the kindness of Mr. Theodor E. Melter, of Jacksonville, Florida, Prof. J. M. Maisch obtained some specimens of the herb *Polygala Baldwinii*, which was placed at my disposal. Mr. Melter stated it to be a powerful diuretic, and to have a strong odor of oil of wintergreen. A subsequent quantity consisting of fresh root and herb had spoiled on the road; so I had to content myself with the examination of the air-dry herb alone.

The herb, which had been in Prof. Maisch's possession a short time, showed evidence of 0.08 per cent. of ethereal oil estimated by Reuter's first method, and the colorimetric comparison of the ferric chloride reaction. Although the second quantity spoken of before had become mouldy, it was nevertheless examined, when I could not get evidence of even a trace of the oil.

During the next season I will endeavor to obtain some more of this plant, both root and herb, and besides intend to examine, in the same manner, as many of our indigenous Polygalas as I can procure, hoping to be able to report on the subject at the next annual meeting.

SECRETARY MAISCH.—Attention may be called in this connection to the apparently wide distribution which possibly some of the ethers of salicylic acid have. It is well known that the oil of wintergreen in the market is not unfrequently obtained from the sweet birch, and that identical compounds are yielded by different species of gaultheria. It should also be borne in mind that years ago salicylic acid was obtained from a number of species of violets, though in what condition it exists in these plants was not ascertained. It is possible that it may exist in the form of an ether, as in those other cases.

MR. CORNELL.—Speaking of the oil of birch, there are many oil stills near Williamsport, Pennsylvania, where I live. I think the greater part of the oil of wintergreen that comes into the market is oil of birch. Only once in a while I find a distiller has oil of wintergreen. All through that section of Pennsylvania you will find small country distillers who have stills where birch grows in abundance, and we have offered there from 25 to 100 pounds a week of oil of birch as well as oil of wintergreen.

MR. MAISCH.—I have learned that oil of wintergreen is occasionally obtained in New Jersey, but as far as I know the true oil of wintergreen comes mostly from the New England States, and the synthetical compound is imported from Europe.

MR. STEVENS.—It is also distilled in northern Michigan.

MR. HALLBERG.—Does the gentleman think, from his observation, that the oil of birch is as useful medicinally as the oil of wintergreen? Judging by what conversation I have had with parties who distil the oil, even the distillers themselves are hardly able to tell the difference; and medicinally I don't know when I am using oil of birch or oil of wintergreen, except as it is given by those who distil it.

Mr. Whelpley.—Oil of wintergreen is now being used extensively in rheumatic troubles on account of the salicylic acid. I would like to inquire whether any one present knows the amount of salicylic acid in the oil of birch, as this would determine to a great extent its medicinal value.

Mr. Barnum.—I have used it in doses of about 30 minims with good success in cases of rheumatism, which indicated about the ordinary dose of salicylic acid. It was sold as oil of wintergreen, but I believed it to be oil of birch.

The following paper was read:

TEREBENE.

BY F. A. THOMPSON, PH. C.

Query No. 61. What are the medicinal properties and what is the purity of the commercial article?

In a general way, terebene may be said to possess medicinal properties not unlike members of the group of terebenthinates, the healing effects of which have so often been vaunted in the treatment of bronchial affections and diseases of the lungs.

Dr. Murrell (*Brit. Med. Journ.*, Dec. 12th, 1885), reports that he used it in one hundred and fourteen cases of winter cough, with success, and even considers it such an excellent remedy in such cases, that he rarely resorts to other remedies. Terebene has little if any toxic effect, and is most agreeably administered on a lump of sugar, or in lozenge form.

Authorities report that the most marked effect of terebene is shown in the treatment of dyspnœa, and this action is likely due to a stimulating one on the heart, and to a contraction of the smaller blood vessels, and partly to astringent properties and diminution of bronchial secretion; and partly to the relief which it affords to the flatulence with which so many of the patients suffering euchysema and other forms of lung trouble are afflicted, and thus allowing full play to the diaphragm by removing pressure below.

From its extended use, it is certainly deserving of a place in our next Pharmacopœia, which should be explicit in its requirements for purity, based on its rotatory power.

Pure terebene is a colorless, oily liquid, having the odor of thyme oil, a specific gravity of 0.864, and a boiling point of 156° C. Its chief peculiarity consists in its being optically inactive, while oil of turpentine, its source of manufacture, possesses a strong rotatory power.

The manufacture of terebene is not a difficult matter, and according to Mr. J. N. Hurty, (*Pharm. Record*, 1886,) it can be easily, as well as cheaply, made by gradually adding to turpentine, drop by drop, 5 per cent. of its weight of sulphuric acid concentrated, avoiding a very high rise in temperature. The operation is best conducted in a shallow glass or porcelain container, exposing to as much air as possible. After allowing the mixture to stand twelve or eighteen hours, the clear liquid is carefully decanted from the tarry residue, transferred to a glass retort and distilled. It is essential that the distillation be carefully conducted, and the portion distilled below 160° C. is reserved and subjected to careful re-distillation, after adding dry potassium carbonate to remove acid and moisture, until it is found to be optically inactive by the polariscope. It is often found necessary to treat the distillate with fresh concentrated sulphuric acid, though this can be avoided to a certain extent by a more liberal use of acid in the first treatment.

While pure terebene should be colorless and optically inactive, we do not find all the samples in the market, bearing such labels, to respond to tests for purity. One foreign and four American brands, representing the leading manufacturers, were treated in this case, with the following results:

No. 1. German.—Bearing the label, "Terebene, Inactive Optically." Specific gravity 0.8747 at 59° F., rotatory power + 0° 20′, colorless, and possessing a satisfactory thyme like odor, left a slight brownish residue upon evaporation; commenced to distil at 152° C. and most of it was distilled over at 160° C., leaving a darkish brown fluid.

No. 2. American.—Labeled Terebene, without any special claim for purity. Specific gravity 0.8641 at 59° F., rotatory power + 17° 10′, nearly colorless, and possessing quite a strong turpentine odor and taste. Upon evaporation left a decided quantity of a brownish resin. Commenced to distil at 110° C., a small amount distilling over at 125°, and most of it below 160° C., leaving a deep brown fluid in the retort, with a strong odor.

No. 3. American.—Bearing only the name "Terebene." Specific gravity 0.862 at 59° F., rotatory power + 1° 16′, decidedly yellow, and possessing a satisfactory odor and taste. Leaves a light, yellowish residue upon evaporation; commenced to distil at 160° C., most of it going over below 170° C., leaving a deep brown fluid in the retort, with a disagreeable odor.

No. 4. American—Labeled simply "Terebene." Specific gravity 0.8616 at 59° F., rotatory power + 0° 40′, and satisfactory in odor and taste. Upon evaporation leaves very little colorless residue, and commenced to distil at 162° C., most of it distilling over at 165°, leaving a decided brown residue in retort, having a disagreeable odor.

No. 5. American—Labeled "Terebene." Specific gravity 0.8636 at 59° F., rotatory power + 0° 38′, and possessing a satisfactory odor and taste. Upon evaporation leaves very little colorless residue, and behaves like sample 4 upon distillation.

The above results indicate that all samples of terebene on the market are not pure, which agrees with the statements of Messrs. Jayne & Chase (*Amer. Jour. Pharm.*, February, 1887), who examined nine samples and found four fairly pure, and Mr. W. Lascelles-Scott (*Yearbook of Pharm.*, 1886), who examined fifteen samples, and found them impure with few exceptions, although all were labeled " Pure Terebene." Comparing the behavior of the above impure and almost pure terebene, based on rotatory power, when distilled or in boiling point, no uniformity of action takes place, making those tests of little value. The only reliable test is with the polariscope, and the absence of more than a very small amount of resinous matter when evaporated.

Detroit, Mich.

The next paper read was on a substitute for cork :

PSEUDOTSUGA DOUGLASII, *CARRIÈRE*, AS A SUBSTITUTE FOR QUERCUS SUBER.

BY A. O. INGALLS.

About five years ago my attention was directed to the bark of the *Pseudotsuga Douglasii* as a possible substitute for the *Quercus Suber*, and under the impression that it might possess a future commercial importance. While the results which I have obtained are not satisfactory in a commercial sense, yet they are such that in the hands of those more able to surmount the difficulties, it may become a good substitute for the cork of commerce. This article is written, therefore, more for the purpose of calling attention to its possibilities than otherwise.

The writer submitted specimens of the bark to several cork manufacturers for the purpose of obtaining an expression of opinion regarding its commercial value, which generally was favorable under conditions of supply. At that time it was impossible to supply any large quantity of bark of good quality, and there the question rested.

The question then arose regarding the cultivation of the tree in a manner similar to that of the cork oak of Europe. Having collected from private and government sources all the literature relating to the cork industry that I could obtain, the writer then submitted the tree to experimentation, covering a period of nearly four years, which probably is too short to determine fully the questions involved, but the result thus far is an improvement in the yield and quality of the bark—of which I submit samples of the bark under normal conditions of growth, and of that under a pseudo cultivation. It will be seen that the tree, under favorable conditions, is susceptible of improvement, but my results do not show that it is yet in a condition to be utilized as a commercial product, or as an economical substitute for the cork of commerce.

The difficulty which has seemed insurmountable has been to prevent the fissuring of the bark, the cause of which is probably to a certain extent climatic, for observation has shown that where the trees are sheltered in such a manner as to reduce the force of the climatic causes, the disposition of the corky layer was more regular, and the fissures not so deep, and even exposed surfaces of the same tree show more and deeper fissures than that of the opposite side. Treatment of the tree in a manner similar to that employed in the cork forests also diminishes the frequency and depth of the fissures.

The *Pseudotsuga Douglasii* has some advantage over the *Quercus Suber* in this, that the corky layers are formed earlier and on younger trees, and a good sample is but little inferior to that of commercial cork, therefore it has this financial proposition in its favor.

To those who may be interested in this subject I will be pleased to impart such information as I can, in the hope that its possibilities may be tested.

Murray, Idaho, August, 1890.

Mr. Maisch.—It is certainly a very interesting subject that the writer of this paper discusses,—the possibility of obtaining cork from a species of pine, while heretofore we have obtained it only from a species of oak. If anything can be done to encourage further investigation and experiments, I think it should be done. If I remember correctly, the author of this paper promises to give information to any one interested in the matter, on writing to him.

The next paper read was the following:

ON THE EMETINE VALUATION OF FLUID EXTRACT OF IPECAC.

BY W. SIMONSON.

The pharmacy of ipecac, as contained in the Pharmacopœia, is extremely simple, requiring only the preparation direct from the drug of a fluid extract, from which are made the syrup and wine, and the tincture of ipecac and opium. Whatever is to be gained in having these galenicals of constant emetine strength may be most readily reached, therefore, by subjecting to an emetine valuation the aqueous solution obtained in making the fluid extract.

In the officinal method of obtaining this aqueous ipecac solution, the fat, wax and other ether-soluble constituents of the drug, as extracted by alcohol, are very largely removed and left upon the filter, about 10, or not more than 15 per cent., remaining in solution. Of the total ether-soluble substances obtainable from the aqueous ipecac liquid, when first acid and then alkaline, 4 to 5 per cent. will come from the acid fluid and 96 to 95 per cent. from the same fluid after being made alkaline. The residue from first extraction will contain scarcely more than a trace of alkaloid, while that from the second will consist of emetine of a quality to be described farther on. Being in relatively small proportion, the non-alkaloid substances may be removed almost perfectly by ether from the acidified solution, leaving nothing but emetine to be extracted when the liquid is made alkaline.

5.00 c.c. of a solution (= 6 gm. ipecac) was washed, in succession, with four portions of ether, 25 c.c. each, and the ether solution washed first with 10 c.c. acidulated water and then with 10 c.c. water. On evaporation the residues weighed:

1st	0.0027
2d	0.0017
3d	0.0004
4th	0.0000

Other measures of the solution, (5.00 c.c. each,) cleansed by ether, when made alkaline by ammonia and extracted with fresh ether, yielded the following quantities of alkaloid residue:

Volume of Aq. Solution.	Volumes of Ether.	Alkaloid.	
		Fractions.	Totals.
40 c.c.	50 c.c.		
	40 c.c.		
	20 c.c.		
	20 c.c.		0.0965
30 c.c.	30 c.c.	0.0954	
	30 c.c.	0.0009	
	20 c.c.	0.0007	
	20 c.c.	0.0000	0.0970
25 c.c.	30 c.c.	0.0965	
	25 c.c.	0.0010	
	20 c.c.	0.0003	
	20 c.c.	0.0000	0.0978
20 c.c.	25 c.c.	0.0836	
	25 c.c.	0.0113	
	20 c.c.	0.0030	
	15 c.c.	0.0000	0.0979
17 c.c.	25 c.c.	0.0912	
	20 c.c.	0.0047	
	20 c.c.	0.0013	
	15 c.c.	0.0004	0.0976

In this solution, the alkaloid is 20 times as great as the non-alkaloid substances, and this ratio has been closely maintained in all specimens of the drug that have been worked by these hands.

As the emetine residues from equal volumes of the solution are moderately uniform, the error of measuring being about 1 per cent. of volume used, the method would appear trustworthy, and is given here in detail as sufficiently meeting the requirements of an assay process.

ASSAY OF AQUEOUS SOLUTION OF ALCOHOL EXTRACT OF IPECAC.

Take of the aqueous solution . . . . 2.50 c.c.
or sufficient to represent about 5 gm. Ipecac
Water,
Stronger ether,
Water of ammonia, 10 per cent.
Dilute sulphuric acid, 10 per cent. . . . . each a sufficient quantity.

To the solution contained in a stoppered bottle, capacity 30 to 35 c.c., add .5 c.c. dilute sulphuric acid and 20 c.c. ether, shake them well together for five minutes, and place aside until they have almost completely separated. Pour off the ether, as closely as possible, into a separatory funnel of 125 c.c. capacity, add to the bottle 20 c.c. ether, shake and pour off as before, repeating the washing a third and fourth time. Transfer the aqueous solution to a separatory funnel, capacity about 60 c.c. To the ether washings add 5 c.c. water and .3 c.c. dilute sulphuric acid, shake well together, allow to separate and draw off the lower aqueous layer, using it to rinse the bottle before adding to the contents of the second separator. Again wash the ether with 5 c.c. water and .3 c.c. dilute sulphuric acid, and add to the contents of the second separator.

To the second separator add 25 c.c. ether and 1.0 c.c. water of ammonia, or sufficient to make the mixture strongly alkaline. Immediately shake the liquids together, but not violently, for about five minutes or until the aqueous layer becomes perfectly clear, and place aside in a cool place until separation is nearly complete. Draw off the lower layer into the first separator (the ether washings having been poured out) and add to it 20 c.c. ether. Shake the liquids together during five minutes, allow to separate, and run the aqueous solution into a third separator. To this add 15 c.c. ether, again shake together, and, when separated, draw out the aqueous liquid and place it aside as sufficiently extracted. Pass in succession through the second, first and third separators, shaking well after each addition and transfer, distilled water, faintly alkaline with ammonia, using 5 c.c. for each washing, until the last portion comes off colorless, about four being necessary.

Decant the ether solution from the second separator into a tared beaker or dish, capacity about 75 c.c., taking care that no drop of water passes in with it. Pour the ether of the first separator into the second, rinse around well, and decant into the tared dish. Pass the ether contained in the third separator through the first and second, and add to the contents of the dish.

Evaporate the solvent in a current of warm air or on a water bath at 30° C. to 35° C., and dry the residue over sulphuric acid during twelve hours. The weight, less tare, of the dish, is the amount of emetine obtainable from the volume of ipecac solution submitted to the assay.

While four washings with ether by decantation will still leave in the alkaloid solution a quantity of ether-soluble matter which is not emetine, the amount is so small that it may be neglected. In one careful trial, in which the alkaloid was freed from this impurity, by shaking back again from ether to aqueous solution and then into a second ether solution, the yield of alkaloid was exactly the same as obtained by the assay process, while the residues were estimated to contain respectively 99.4 and 98.6 per cent. pure emetine.

Two extractions of the ether washings with 5 c.c. each acidulated water are ample—in a series when tested, a third washing giving a turbidity but not a precipitate, with an excess of potassio-mercuric iodide, a very sensitive reagent for emetine.

The volume of solution, as prepared for precipitation, should be about 15 to 18 c.c. If it is much more, a small part of the alkaloid will fail of extraction unless a fourth portion of ether be used; while, if less than 15 c.c., as 10 c.c. or less, a substance other than emetine, thrown out with it, will assume a coherent extractive-like condition, in many cases though not in all, and prevent the ether from taking up all the alkaloid. In one trial, in which precipitation of the undiluted aqueous solution was attempted (5 c.c. representing about 7 gm. ipecac) the emetine obtained was but 70 per cent. of that known to be present. If the solution be diluted until 3.5 to 4 parts equal 1 of ipecac, the non-alkaloid substance will go out in a finely divided, rarely coherent state, and the alkaloid can be separated from it by the shaking with ether.

In making the precipitation, the volume of ether ordered should be added first, in order that the two liquids may be shaken together the instant that the alkaloid passes from aqueous solution. This shaking should be rather a rolling of the fluids together, as by a circular, horizontal motion, and should never be a violent churning, as in that way an obstinate emulsion may be formed. At best, emulsifying will occur to some extent; but the alkaline washing water, when well shaken with the intimate mixture of ether and extractive solution, will usually cause them to separate completely. The washings with alkaline water should be continued until the last addition comes off quite colorless.

Evaporation of the ether solution is best done in a dish in an air bath at 40° C. to 50° C. If done on a water bath, the operation involves a constant fanning of the surface of the solution to prevent its creeping over the rim of the dish. When the solvent has nearly vaporized, the dish should be rotated and inclined in such a way as will get the residue in a thin and nearly uniform layer. Without this manipulation the alkaloid will oftener be left in a narrow and thick ring, which will require several times the prescribed twelve hours for drying to nearly constant weight, and will require many days over sulphuric acid before the weight is perfectly constant.

In making weighings no precautions are necessary, as, aside from acquiring a yellow color, the alkaloid, if obtained from well-washed solutions, is permanent in the air, not increasing perceptibly in weight upon ten days' exposure in a moist summer atmosphere.

It is next necessary to determine the purity of the residues weighed as emetine. In twenty residues, all but two were perfectly soluble in a dilute acid to a clear fluid, and these two left a film scarcely weighable, the solutions being quite clear. The method used rests upon the power of the alkaloid to form with acids neutral salts, the quantity of alkaloid in a residue being calculated from the quantity of acid saturated by it. N $\frac{1}{50}$ sulphuric acid is the most convenient standard acid solution. A solution of purified litmus coloring is a good indicator. (Sutton's Handbook, Vol. Anal., p. 31 [c.]) As the emetine solutions in the standard acid are always yellowish, the change from acid to alkaline reaction, as the excess of acid is saturated by N $\frac{1}{50}$ soda, is not easily seen, and is best observed by having two solutions equally tinted by litmus. The beginning of alkalinity is shown by a slight darkening of the fluid and production of a peculiar greenish tint, not to be described, but readily seen by placing alongside the unaltered comparison liquid. With this aid the titration will usually be correct to .10 c.c. or within .20 c.c.

In the manner described seven emetine residues were saturated by standard acid, the quantities being given in the following table:

No.	Alkaloid.	C.c. N$\frac{1}{50}$ Sulphuric Acid.
1	0.1146	21.2
2	0.1432	27.75
3	0.1027	20.10
4	0.1405	27.5
5	0.0963	18.9
6	0.0716	13.9
7	0.0715	14.0

On referring to the more accessible sources of information, the following formulæ for emetine are found:—

Pharmacographia. Flückiger and Hanbury:

Reich, $C_{20}H_{30}N_2O_5=378$.
Lefort (1869), $C_{30}H_{44}N_2O_8=560$.

National Dispensatory:

Lefort & Wurtz (1877), Ann. Ch. & Phys. (5), 12, p. 277, $C_{28}H_{40}N_2O_5=484$.

U. S. Dispensatory:

Glenard, Ann. Ch. & Phys. (5), 8, p. 233, $C_{15}H_{22}NO_2=248$.

Kuntz, Archiv der Pharmacie (3), 25, 461, $C_{30}H_{40}N_2O_5=508$.

Watt's Dict. Chemistry, 1889 (observer not named), $C_{30}H_{40}N_2O_5$ (?) $=508$.

The quantivalence of the alkaloid is not stated, but, whether monad or dyad, these molecular weights vary so much that no selection is possible. Recently, however, the molecule has been shown by Blunt (Ph. Jour. (3), 20, p. 809) to be dyad.

To determine the ratio between an acid and the alkaloid, and therefrom to approximate the molecular weight sufficiently to make a choice among those given above, the neutral sulphate was made and tested as detailed below:—

From an aqueous solution of an alcohol extract of ipecac, alkaline by sodium carbonate, the alkaloid was taken by ether; from the ether solution, after washing twice with half volume water, alkaline by sodium carbonate, by 2 per cent. sulphuric acid in excess; and again from aqueous solution, after repeated washings with ether, by sodium carbonate and ether. The last ether solution, after several washings with water, faintly alkaline by ammonia, yielded the alkaloid as a nearly colorless amorphous residue. This was dissolved in a very slight excess of 10 per cent. sulphuric acid, the excess exactly saturated by sodium carbonate, and the solution evaporated to dryness at 40° C. to 50° C. The dry sulphate was next dissolved in hot absolute alcohol, to form a 10 per cent. solution, leaving the small quantity of sodium sulphate, and filtered after cooling.

As emetine salts are amorphous, and have no fixed limit of solubility, evaporated solutions leaving an extractive-like mass, recourse was had to ether, in which the sulphate is as good as insoluble, to separate the small amount of either emetine or sulphuric acid possibly present in the alcohol solution.

Eight volumes of stronger ether (containing about 96 per cent. absolute ether, the remainder mainly alcohol) was poured carefully over the alcohol solution and the two liquids mixed by violent shaking. The very voluminous precipitate was washed with ether, once by decantation using 10 volumes, and after collecting in a funnel, with about 20 volumes in small portions. Exposed to air, the washed precipitate contracted to a very small bulk, and, when sufficiently dry to powder, much resembled resin of jalap.

(A) The dry finely-powdered salt was given two emetine estimations, and the water determined by drying to a constant weight at 100° C. in a current of dry air.

(1) . . . 0.1136 salt gave . . . 0.0890 emetine . . . 78.35 per cent.
(2) . . . 0.1408 salt gave . . . 0.1113 emetine . . . 78.34 per cent.
(3) . . . 1.0488 salt lost . . . 0.0682 at 100° C. . . . 6.50 per cent.

If calculated to anhydrous salt:—

(1) . . . . emetine . . . . 83.78 per cent.
(2) . . . . emetine . . . . 83.79 per cent.

(B) Salt used in (A), dried during three days over sulphuric acid (the very hygroscopic powder kept in a weighing tube), was given one emetine estimation. Water was estimated as before, and sulphuric acid determined in about .500 of salt in 100 c.c. water.

(1) 0.1008 salt gave . 0.0820 emetine . . . . 81.35 per cent.
(2) 0.5090 salt gave . 0.1910 $BaSO_4$=0.080335 H_2SO_4=15.78 per cent.
(3) 0.5174 salt gave . 0.1930 $BaSO_4$=0.08117 H_2SO_4=15.68 per cent.
(4) 1.0118 salt lost . 0.0312 at 100° C. . . . . . . = 3.08 per cent.
Calculated to anhydrous salt, (1) . . . . emetine . . . . 83.93 per cent.

(C) Salt dried at 100° C. in current of dry air, to constant weight. At

120° C. this product lost 6 per cent. but became tinted pale reddish, apparently slightly decomposed.

(1) . 0.1450 salt gave . 0.1214 emetine . . . . =83.72 per cent.
(2) . 0.5140 salt gave . 0.1979 $BaSO_4$=0.08324 H_2SO_4=16.20 per cent.

Relation of acid to alkaloid.

(A)	(1) emetine	81.35 per cent.
	(2) H_2SO_4	15.78 per cent.
(B)	(1) emetine	81.35 per cent.
	(3) H_2SO_4	15.68 per cent.
(C)	(1) emetine	83.72 per cent.
	(2) H_2SO_4	16.20 per cent.

15.78 : 81.35 :: 98 : 505.3
15.68 : 81.35 :: 98 : 508.4
16.20 : 83.72 :: 98 : 506.5

These figures point to the formula of Kuntz, $C_{30}H_{40}N_2O_5$=508, as being the correct one, and certainly prove that that molecule is dyad, confirming the statement of Blunt, previously cited.

If this formula be accepted, the salt used in the second series of estimations (B) probably has the following composition :—

$C_{30}H_{40}N_2O_5$, H_2SO_4,H_2O=624.

	Calculated.		Found.	
$C_{30}H_{40}N_2O_5$	81.41	per cent.	81.35	per cent.
H_2SO_4	15.705	“	15.73	“ (mean.)
H_2O	2.885	“	3.08	“
Total	100.00	“	100.16	“

And that used in third series, (C) :—

$C_{30}H_{40}N_2O_5$, H_2SO_4=606.

	Calculated.		Found.	
$C_{30}H_{40}N_2O_5$	83.83	per cent.	83.72	per cent.
H_2SO_4	16.17	“	16.20	“
Total	100.00	“	99.92	“

Returning now to the weights of the emetine residues and the volumes of N$\frac{1}{50}$ sulphuric acid saturated by them, it will be seen that, with the emetine molecule surely dyad, 1 c.c. of the standard acid neutralizes 0.00508 alkaloid. On this basis the quantity of emetine in each residue is calculated, and the percentage of pure alkaloid found therefrom. As the experimental error is about .5 to 1 per cent., the fractions in last column of following table should not have too great value placed upon them.

No.	Alkaloid Residue.	C.c. $n_{\frac{1}{50}}H_2SO_4$.	Emetine indicated.	Percentage in Residue.
1.	0.1146	21.2	0.107696	94.0
2.	0.1432	27.75	0.14097	98.4
3.	0.1027	20.1	0.102108	99.4
4.	0.1405	27.5	0.1397	99.4
5.	0.0963	18.9	0.096012	99.7
6.	0.0716	13.9	0.070612	98.6
7.	0.0715	14.0	0.07112	99.4

So far as the quality of the product goes, the assay process stands approved and is apparently trustworthy.

Evidently, instead of weighing the ether residue, the process may be amended by dissolving the alkaloid in an excess of standard acid, or, if sodium carbonate be used as precipitant, by evaporating the ether solution in presence of an excess of standard acid; in either case the excess being titrated by $N_{\frac{1}{50}}$ alkali. In this way the quantity of pure emetine is obtained at once, and there is avoided the tedious drying over sulphuric acid. For assay purposes the drying is sufficiently done at the end of twelve hours, provided the residue is spread evenly in a thin layer, but for accurate analyses it will require fifty hours at least, and often half as much more. However, present experience with the alternative method is not sufficient to recommend it here, and even should it prove equal to the gravimetric process, it will remain subject to the disadvantage that there are many who cannot use it well through inability to distinguish colors sharply.

It remains to acknowledge aid as well as information from papers by the following authors: Cripps and Whitby, *Pharm. Jour.* (3), 19, p. 721; Blunt, *Pharm. Jour.* (3), 20, p. 809.

Cincinnati, July 2, 1890.

Mr. Hallberg.—This paper, like others which have been presented by Mr. Simonson, contains a wonderful amount of work, and, as far as this particular one is concerned, I think that the assay process is unquestionably much superior to one with Mayer's solution, which was referred to in a paper read at the morning session.

Mr. Lloyd.—I am intimately acquainted with Mr. Simonson, and can corroborate the statements just made. He has performed this work at odd times, being engaged in the drug business in Cincinnati as a clerk, after his working hours, whenever he could get a moment to spare, and it is unquestionably accurate. I think he deserves a great deal of credit for the care and attention he has given this subject. He has also made analogous researches on nux vomica, and I believe also on belladonna. In the estimation of the value of emetine in the ipecac, you will notice he has also considered the molecular weight of the substance, and that is interesting—I think more so than the proportion of emetine he has found, which agrees closely with what others have found.

Mr. Sayre.—I enjoy hearing such papers as that read. Standardization is uppermost in the minds of the pharmacist of to-day; and whether the Pharmacopœial Committees ever get around to it or not, we are working towards it, and the time will soon come when we shall have standardized goods. I think teachers of pharmacy who are here appreciate as I do this sort of work, and you will join with me in saying that such work must, before long, bring forth very valuable fruit.

The Section then adjourned until Thursday afternoon.

THIRD SESSION—THURSDAY AFTERNOON, SEPTEMBER 11.

Chairman Whelpley called the Section to order at four o'clock, and called upon Mr. Connor to read the following paper:

PHARMACISTS AS FOOD INSPECTORS.

BY L. MYERS CONNOR, PH. G.

This subject may seem, in a manner, foreign in relation to this body, yet upon closer investigation it will become manifest that it is practically inseparable.

The secular press, as well as scientific journals, are overflowing upon the subject of rigid food inspection. National, state, county and city bills are in contemplation everywhere; the next question arises, who will fill these many various positions in scientific and conscientious researches? In answer, I will say that the educated pharmacist must be chosen. This one stimulant alone should afford sufficient encouragement to the student, as it will give him both profit and pleasure, resting his mind from the many monotonous duties of a daily dispenser, and in many instances providing him with a revenue adequate for his maintenance.

It is a branch of the chemical science that is fascinating, by reason of the variety of investigations to be pursued, by the favor it meets with public sentiment, and further by its revelation of cunning art and chemical curiosities, by hands of skillful manipulators, made so by years of experience and numberless experiments.

The agitation of this subject by statesmen throughout the land has certainly not escaped your notice, and, if so, you have only to refer to Congressional records to find that urgent measures are being taken, under titles of "Adulteration Acts."

It is a subject that is meeting with encouragement from every source, and the time is not far distant when every city in the universe, of 50,000 population, will be provided with proper laws suppressing the sophistication of food and drink.

A rich harvest can be reached if the student will provide himself with such works as "Hassell on Food Adulteration," and carefully peruse the same, as it is an elaboration of the subject and will naturally place his mind in that line of thought, and at the same time is not detracting from any other branch of like studies.

The people are becoming thoroughly aroused to the importance of such work, as the purity of nearly every article of food, such as is manufactured, is now justly questioned.

It may be that, already, many of you have been called upon to determine the purity of the necessities of life, and possibly a few have found favor in such work; but, be it as it may, a position of such character will pay you far better than a reasonably well regulated shop, and I firmly believe that the demand will be made upon you to fill such positions in a very short space of time.

The laboratory requirements for this branch of work need not necessarily be expensive, as you are rarely ever called upon for quantitative estimations, but it is quite sufficient to determine without doubt that the matter under investigation has either had something added or subtracted.

A complete list of reagents must, at all times, be at hand, with the ordinary apparatus for evaporating, distilling, incinerating, drying, etc.

I have been engaged in this work for several years, and although my investigations have been limited, dairy products occupying the major portion of my time, yet I am very much infatuated with the labor.

The commercial standpoint is one of the chief causes that have increased the imperative demand for rigid inspection, as honest competition falls short of its mark when confronted by vile sophistications, which are multiplying with such rapidity that integrity of production finds no place of safety.

The next cause of complaint, and one that further enhances the demand for protection, is Sanitation.

The maculate mixer, void in some instances of the first principle of scientific learning, cheapens his material with poisonous colorings and flavors, in order to mask the true composition of his unwholesome stuff.

The city of Dallas, Texas, a place in the far West, of about 60,000 population, has duly commissioned me as City Chemist, and pays me liberally for my labor; and the fines arising from the conviction of violators of dairy products alone have, for the most part, balanced my yearly salary, aside from the protection of the people from contaminated products.

The office has grown in favor, and I candidly believe that if double the amount was necessary for conducting such inspection, our people would be unanimous in popular vote; and so from this single instance you may readily see that the pharmacist need no longer depend wholly upon close confinement of 16 to 18 hours' work, if he will properly qualify himself for work in this direction; and after proper enactment of rigid laws governing such cases, a United Association of Inspectors would soon have the effect of restraining the introduction of adulterated food, in every portion of the United States of America.

Some may say that a more practical or scientific paper is better suited to the demands of this organization, but I take it that a man is in great part measured by his money, means and morals, and honest competition in the retailing of drugs leaves small margins from which to provide gray hairs with the comforts of life; and each of us is striving to attain that lofty order of learning for the chief purpose of financial preservation.

The apothecary is no longer the one of olden times, with large profits of individual production; but at present he is compelled to purchase the preparations of manufacturers from nearly every letter in the alphabet, depriving him of his rightful profits, which are essential to success.

An important instrument came near escaping mention, and that is the microscope, which is absolutely required; and you should select a first-class instrument, and make careful comparative examinations of all substances, by selecting articles of known purity, and then adulterating with such matter as is generally used, in different degrees, making careful notes and drawings of the same; and with a proper text-book you will in a reasonable length of time be able to detect admixtures with no degree of uncertainty.

The information afforded by the use of the microscope cannot be secured by any other means, for, as some writer has said, there is more that we have not seen than that we have.

In conclusion, there may be no question but what pharmaceutical students should receive an obligatory course on food adulteration, as above stated. It will provide an additional source from which to obtain support, and will in no wise impede, but further the advancement in collateral branches.

Dallas, Texas, August, 1890.

MR. FINLAY.—I see something in this paper which will possibly be a keynote to other cities as far advanced in population as Dallas. I come from New Orleans, but I regret to state that we do not have a city chemist, and any work that is done in behalf of the public, and to carry out the ends of justice, has to be specially paid for. A chemist has to be employed for the purpose and regularly compensated, which sometimes happens to be an expensive business. I think every city in the Union that pretends to be a city of any importance should be provided like Dallas, and I congratulate that city in having kept up with the march of progress in that respect. I shall use my endeavors as a member of our city council to establish such an official in New Orleans. While I hesitate to make the confession, I am glad there is something there to build on for the benefit of the citizens of our city; for it is required that one member of the Board of Health shall be an expert chemist, and we attain the same object as Dallas does, not from one person, but from an organization. The chemist of our city happens to be Mr. Hall, who is a member of this Association, and I know that he reaps quite a nice salary from it, in the neighborhood of fifteen hundred dollars. A few hours each day he attends markets to examine and confiscate material, and he secures enough fines to more than pay the expenses of the entire Board of Health. I have no doubt that similar organizations exist in other cities, but I merely give the information for the benefit of those who may be unaware of the fact.

MR. MARKOE.—Perhaps a word or two in regard to the organizations which do this work in Massachusetts may be of interest. The city of Boston has within the last few years advanced very rapidly in this regard. I may refer to the excellent system of inspection of milk, butter and vinegar, which has been established. There is an officer who is called the Inspector of Milk and Vinegar, whose office it is to inspect the milk and dairy products, and that has come to be an exceedingly efficient organization. The different contractors are drawn upon for samples; every milkman has to be licensed, and the methods of assaying have been so perfected that it is very rare now that an Inspector loses a case when it comes to court. The State of Massachusetts has also a State Board of Health, which does more or less of that work, and has jurisdiction over the entire State. The work done by the Board is extensive and comprehensive, there being an analyst of drugs and medicines, a milk analyst, etc., so that every food product and medicinal substance is subject to a rigid inspection, and the result has been a vast raising of the standard in food products and in medicines. The system has now been in practice for quite a long time, and has become pretty well regulated, so that the wrong-doers come to grief in short order. Mr. Davenport may add something to what I have said, as he is Inspector of Drugs in Boston.

Mr. Simmon.—I thought all the State Boards of Health had their chemists, duly appointed to look after these things. In Minnesota we have a good State Board of Health, having a Dairy Commissioner, and a regular State Chemist, and all the larger cities have their own Boards of Health. In some places, like Minneapolis, the City Board looks after the milk, and leaves it to the State Chemist to make the examination. I think the State Chemist has turned in many analyses of milk, vinegar, butter, lard and different articles of food right along, and to-day you can go to all the Minnesota cities, and get butter instead of oleomargarin, and good vinegar, without fear of adulteration.

Mr. Davenport.—Having had the fortune to be the executive officer or the chemical expert, employed by both the State of Massachusetts and the City of Boston in the enforcement of their anti-adulteration laws, I have had occasion to gain considerable practical knowledge of just how the business is conducted in our city and State. The State annually appropriates $10,000 for the enforcement of these laws, while the city of Boston is spending some $12,000 for the same purpose. They act under the General Law of the State which governs the sale of drugs and food products; to the special laws relating to some of the latter I will refer hereafter. The law in relation to adulteration of drugs defines the term "drug" as including all medicines for internal or external use, antiseptics, disinfectants and cosmetics. A drug shall be deemed to be adulterated within the meaning of the Act, (1) If when sold under or by a name recognized in the United States Pharmacopœia it differs from the standard of strength, quality or purity laid down therein, unless the order calls for an article inferior to such standard, or unless such difference is made known or so appears to the purchaser at the time of such sale; (2) If, when sold under or by a name not recognized in the United States Pharmacopœia, but which is found in some other Pharmacopœia, or other standard work on materia medica, it differs materially from the standard of strength, quality or purity laid down in such work; (3) If its strength or purity falls below the professed standard under which it is sold.

The special law as to milk, butter, cheese and vinegar is carried out as follows: One or more Inspectors of Milk are selected for each city. The inspectors may enter any place where milk is kept for sale, and take samples for analysis, or take them from conveyances on the street. Every person who sells milk, employer or employee, pays an annual tax of fifty cents to the inspector for a license. A fine of $100 is imposed where milk is sold without such license. It is further provided that any person who sells milk produced from cows fed on the refuse of distilleries, or from sick or diseased cows, shall be punished by a fine of from $200 to $300, or by imprisonment. Any person who sells milk from which the cream or any part of it has been removed, unless sold as "skimmed milk" is subject to the same penalty. In all prosecutions if the milk is shown, upon analysis, to contain more than 87 per cent. of water, or less than 13 per cent. of milk solids, or less than $9\frac{3}{10}$ per cent. of milk solids exclusive of fat, it shall be deemed adulterated.

The law regarding vinegar adulterations provides that every person who manufactures and offers for sale any vinegar not the legitimate product of pure apple juice, known as apple cider, or vinegar not made exclusively from it, or vinegar in which foreign substances, drugs or acids have been introduced, as may appear by proper tests, shall be fined one hundred dollars for each offence. The act further states: "All vinegars shall be without artificial coloring matter, and shall have an acidity equivalent to the presence of not less than four and one-half per cent. by weight of absolute acetic acid, and in the case of cider vinegar shall contain in addition not less than two per cent. by weight of cider vinegar solids upon full evaporation over boiling water; and if any vinegar contains any artificial coloring matter, or less than the above amount of acidity or of cider vinegar solids, it shall be deemed to be adulterated."

The law applying to butter, oleomargarin and cheese provides that all imitations of butter or cheese shall be plainly marked with the words "Oleomargarin," "Butterine," "Imitation Butter," or "Imitation Cheese," as the case may be, and provides strict penalties in case of misrepresentation.

Since my appointment in 1882, politics have had no influence in any wise on these departments. The Massachusetts laws I think are the best laws that we have in this country regarding adulteration, and I think they are also better enforced than similar laws in other states. I might add that after the milk adulteration law had been in effect for some time, it was found that four or five quarts additional of milk, on an average, was required to supply a given number of customers, which proved that water was not so convenient. As is customary in some of the other states, we have examined milk by gravity alone. We found that was not sufficient, because our milkmen had caught on to the idea that by simply letting the milk rest, and allowing the cream to rise, the gravity was increased. Then as this skim milk was rather bluish in color, a little solution of annatto made it foot up a very rich, creamy color. It is the custom in Boston to deliver the milk in small cans; every family wants pure milk, and evidence of it by a little cream on top; the addition of a little annatto to the skim milk gave the desired effect.

MR. CONNOR.—In Dallas, milk is carried from the commercial can to the customer. Our ordinance provides for the selling of only two kinds of milk, sweet milk and buttermilk. We do not allow any other.

MR. HALLBERG.—It is an interesting subject, and while, of course, many of the larger cities have an official chemist, judging by my experience in Chicago it is neither comprehensive enough nor accurate enough to protect the public against the adulteration of milk. In Chicago, every day, the inspectors go out and board the trains, as they come into the city, early in the morning, and take samples of the milk. These inspectors are political men chiefly, and I know several instances where they have been very lax in securing samples. They have secured only such samples of milk as they desired to secure, and let others go. I think in all large cities that protection to the public will not be accomplished by simply having the City Chemist and inspectors of this character secure specimens. If we could provide an additional system to this plan of official inspection, by following out Mr. Connor's idea, it would not only be remunerative to the pharmacist, but would open a new field to him, wherein he could devote himself to his profession to the widest possible extent. Suppose, for example, a large city of over half a million people was divided up into a certain number of districts, say 25, and then 25 qualified pharmacists were appointed for these districts as Special Inspectors, it would not only be a convenient, but a very reliable system. In that case, when people wanted anything inspected in the way of food supplies, they could go perhaps to the family druggist, who might be the inspector, who could make an examination for a certain fee, and if this preliminary examination warranted further examination, it could be referred to the city chemist. I have thought over this subject for several years, and I believe that now, since we are enacting laws pertaining to the regulation of the quality of butter lard and other articles, this seems to open a good field for the pharmacist; the work would not only be very remunerative, but would give the calling of the pharmacist a high tone that could not be secured so well in any other way. No doubt, the colleges of pharmacy would decide, after a while, that a course in analysis to fit students for this kind of work would be highly desirable, and we would get a class of highly qualified chemists and pharmacists into the ranks of pharmacy that would be a credit to the profession and to the community. I have referred to the subject in this way, because I thought possibly it might be connected with it in one way or another.

MR. HAIGH.—I would like to speak on this subject with reference to St. Louis. It seems that in most States the adulteration laws are very ineffectual, since the means of carrying them out are being governed solely by politics. We know very well the injustice that has been done by appointing to these offices men who are totally incompetent to do the work. In the oleomargarin appointments we have had instances in many of the States where the men appointed to do the work prescribed by the oleomargarin law didn't know what a reagent is, or anything about the chemistry of butter. However, the city of St. Louis is probably a little more comprehensive than other cities in this respect. The dairy companies have their own chemists, and deliver each day to every customer an analysis of the milk which is sent. They guarantee the analysis to be true; and there is a certain penalty enforced unless it is correct. It seems this brings about better results than any of the laws that have been passed by the State, or the city, to prevent adulteration. If the pharmacist perfects himself in this work, however, he will reap the benefits of it in the future, and in that respect I agree with the paper.

MR. DAVENPORT.—These offices are not always political, and as a fair illustration of this, last year I had occasion to prosecute the present chairman of the Democratic ward-committee, and soon after the chairman of the Republican committee.

MR. MAISCH.—The system for collecting specimens for examination may perhaps vary in different localities, and it is possible that some improvements in the modes hitherto followed may be made; but I know from the official reports of the Boston chemist for a number of years past, that the quality of milk in that city has improved under the system adopted there. There is no doubt of that, and Boston, I believe, is to-day better supplied with pure milk than any other large city in the country. Our city fathers in Philadelphia are of a different stamp to those of Boston. I believe the Boston system works under the city law.

MR. MARKOE.—City and State, both.

MR. MAISCH.—The State of Pennsylvania has done nothing in the matter, and the attempt was made in Philadelphia to pass a law for the inspection of milk, the proposition being to fix the standard at 12 per cent. of solids, the Boston standard being 13 per cent. Our City Council objected to that, and some suggested it should be 11½, and others thought good cows frequently yielded milk that wouldn't give more than 10 or 11 of solids, and the consequence was, nothing was done.

In regard to oleomargarin I may say that in the State of Pennsylvania oleomargarin is not allowed to be sold, according to law, although I believe a good deal of it is sold there.

Now, as to the enaction of laws bearing on adulteration, it seems to me that it is utterly wrong to enact laws governing the adulteration of special articles; for the broad standpoint should be taken that no article of food should be adulterated. In the drafts of laws that I have seen against the adulteration of food, there is very generally a clause contained to the effect that any article shall be considered adulterated if any thing has been added with the view of weakening it, or of concealing its low quality by causing it to appear better or stronger than it really is. In my opinion, the law should state that an article of food must be sold under a name indicating exactly what it is, and whether anything has been added to it. One instance of this, which is familiar to us all, is the ground mustard. When yellow mustard seed is ground, the powder that is yielded is by no means yellow; it is of a grayish color. Notwithstanding this, you will find that the general public will not buy pure ground mustard, because it is not yellow. The pure article does not look like what they have been accustomed to, and for that reason manufacturers are compelled to add turmeric or some other substance in order to produce the yellow tinge necessary in order to sell it. Some of the mustard imported from England, I understand, is prepared in this way, but in England it must bear on the label "Colored bv Turmeric." That is a sensible law for people who don't know when the thing is adulterated. The question arises, in this connection, is the addition of a little turmeric to ground mustard adulteration? It would seem that it is not, for it does not weaken the mustard, does not heighten its quality, but is simply added to cater to the public taste. I think, however, the label suggested should be attached to each package of mustard that is sold, when prepared in this way. If we can enact a general law against the adulteration of food, that would probably be the best way to arrange it, instead of enacting fifty or more special laws against the adulteration of certain articles.

MR. RICE.—I agree with Prof. Maisch that it would be very desirable to have a general law against adulteration, but it appears that he was not aware that that has been attempted in one or two States, one of which is New York. In that State, after a thorough inquiry by a committee appointed by the Legislature some years ago, it was decided to be impracticable, because there are certain articles of food that people will not buy unless they are prepared for cooking, such as cocoa. Now, it is well known that pure breakfast cocoa is merely the bean ground up, and that we buy is prepared. It was found to be so difficult to put a guard around the law that the whole subject was dropped.

MR. DAVENPORT.—The objections raised bv Prof. Maisch and Dr. Rice are met by the Massachusetts General Law, which provides that no article shall be sold under a misleading designation, or sold as pure when anything has been added to or taken from it. The law also states that any mixture customary to be used for food, which is harmless, the Board may declare lawful; and it thus provides for any contingency of the kind which has been referred to.

MR. MAISCH.—Under the provisions of the Massachusetts law, do you sell, for instance, pure ground yellow mustard, or has the coloring with turmeric, been permitted by the Board of Health?

MR. DAVENPORT.—Yes, the addition of turmeric is permitted.

MR. SEABURY.—From my investigations I believe there is not a single manufacturer who makes pure mustard for domestic purposes. Mr. Maisch has stated that the powder obtained from ground mustard seed is of a grayish color, and that turmeric is used to produce the yellow tint, which is quite correct; but he has not spoken of other adulterations which are constantly used. Wheat starch and other ingredients are used to an extent of from 25 to 50 per cent. Now, there are lines which should always be drawn by an inspector of foods. I will admit that a little mustard may be a good therapeutic agent in exciting peristaltic action; I would not use the really pure article for the benefit of my stomach—no man would. Pure mustard is never sold to the consumer. I have never yet seen a package that was pure, and in my judgment it would be a detriment to the human family if it were pure. It may be of interest to note, that whenever a question has arisen as to the simulation of the trade-mark of a manufacturer of this article, if his label states that it is "pure mustard" he gets beaten in an action at law, because the mustard is not pure, and, as a fact, never can be.

MR. FINLAY.—Pursuing the subject of general adulteration, we may take the spices for instance, which are more or less adulterated, and especially pepper. How little ground pepper is found that is pure! It reminds me of a little catch on the subject. The accepted method of spelling pepper is with three p's, but the spice men have thrown in another—there are four p(ea)s in pepper as you now find it.

MR. DAVENPORT.—In Massachusetts every sample of mustard sold containing anything else than turmeric, which is authorized, will be confiscated.

MR. MAISCH.—We are fortunate enough in Philadelphia to have pure mustard—that is, mustard simply colored with turmeric, and to a limited extent we have ground yellow mustard that is not thus colored. As a rule, I believe the fixed oil is pressed out.

MR. CONNOR.—Our law is about covered by two words "adulteration" and "substitution:" that explanation covers the entire ground.

The following paper was then read:

CASCARA SAGRADA AND ITS ALLIES.

BY H. H. RUSBY, M. D.,

Professor of Botany and Materia Medica in the College of Pharmacy in the City of New York.

It is somewhat peculiar that it should so frequently be the case with our more important drugs that the determination of their origin, or their positive identification, should be attended with great difficulty. Scarcely any study connected with pharmaceutical science has presented greater difficulties than Cinchona barks. Two specimens scarcely to be distinguished externally might represent positive extremes as to their yield of valuable alkaloids. Even microscopical characters frequently failed, and the appearance of the growing plants or their herbarium specimens often gave no clue, or even increased the bewildering maze by the gradations and intermixings of the species; so that at length it came to be an accepted principle that successful buying could be based only on chemical assay. Similar difficulties are presented by the several cinnamon barks. We cannot always distinguish between cassia bark and an old cinnamon bark that has not undergone the customary processes, and it is only by flavor and odor that we can judge of quality. We are informed that the collectors of the wild products cannot distinguish between the many species and varieties as they grow by their external marks, and depend upon smell and taste in their selection. As the value of Quebracho becomes more generally accepted, we begin to hear of two or more varieties that are readily confused at the point of growth, and the same thing is true of Coto.

In the case of *Rhamnus Purshiana* we have all these difficulties strongly pronounced, and at the same time we miss the presence of any principle like oil of cinnamon or alkaloid of cinchona, the estimation of which can serve us as a guide. Not until the medicinal preparation has been made and administered and its effect observed, have we been accustomed to appreciate the nature of the bark employed. That one preparation will differ widely from another in its medicinal effect, is a matter of every-day observation by all. Yet we cannot assume that gross carelessness has been displayed in certain cases. The cause is to be found in the natural difficulties attending the selection and identification of the material. As usual, the difficulty begins in the field. If the collector encounters a locality where the plants are typical, or of a variety diverging from the alternative species, no difficulties are presented. But if he happens to encounter some of the intermediate forms, he should not be too sharply reproached for falling into error. Even accomplished botanists who have written special treatises on these plants, have done as much. Thus Mrs. T. S. Brandegee, late Mrs. Curran, wrote as late as 1888, "All our forms" (of *R. Californica*) "running together, seem also to run into *R. Purshiana*." and Prof. William Trelease, of the Missouri Botanical Garden, writing a year later, says, "In the broad-leaved form (of *R. Californica*) distributed and described by Howell as *R. occidentalis*, from Oregon * * * this species appears to range further northward than usual and approach the preceding (*R. Purshiana*). Indeed, some herbarium specimens are hard to place." Only last month I detected in one of our largest herbaria a sheet of *R. Purshiana* which had passed for a generation under the eyes of our botanists as a form of *R. Californica*.

The difficulty is that we cannot know at the outset which botanical characters, or the characters of which particular organs, are to possess the greatest value in classification. In one group of plants, like the immense genus Solanum, the length and form of the calyx lobes and the size, form and direction of the anthers are well nigh invariable in the same species, and serve as infallible marks for determination, while in another genus or family these characters vary widely in different individuals of the same species or variety, and are thoroughly worthless as specific characteristics. It is only after a group has been considerably studied that we can learn which characters to especially rely upon in its classification.

Under such circumstances as these, it is only the most able and experienced collectors who can expect, in certain localities, to collect purely the genuine Cascara Sagrada, and we can expect nothing less than that more or less spurious material will get upon the market. At times the proportion of such bark has been very large, while again there would be, for a time, but little of it seen.

Provided that it is once collected, whether mixed with the genuine or offered separately, the ordinary buyer is quite unlikely to detect the error. As will be seen by the series of specimens presently to be exhibited, the similarity in the gross appearance of the genuine and spurious barks is much greater than any existing between the herbarium specimens, and is, indeed, so great that while we may be able in general to distinguish between them, yet we cannot claim to be able to do so in all cases, and I find myself totally unable to indicate a sufficiently characteristic difference in description. Being up to the present time without any chemical tests for distinction, we are reduced to the necessity of relying upon the section and the compound microscope, if we would be certain of our determination in the absence of herbarium specimens. Throughout a long experience with this article, I have been accustomed to demand leaf and flower specimens to accompany the bark samples. But this requirement cannot always be complied with, and, moreover, we must be able to satisfy ourselves of the identity of these with the bark which they accompany. From the habitat much assistance can be derived, because while the ranges of the respective specimens are not rigidly restricted, yet they are rather clearly defined.

There are certain species which we can rule out as not presenting for us any interest, their barks being altogether unlikely to present themselves under the name of Cascara Sagrada. One is the *R. alnifolia*, which occurs so rarely in the Cascara district as to require no attention. Another is the *R. crocea*, with its several associated species or varieties, which could not possibly be mistaken for anything else. Their twigs are more or less spinescent, the leaves oval or roundish, very thick and commonly spiny-toothed, and the fruit small, roundish and red. The bark presents no similarity whatever to Cascara Sagrada, nor indeed to that of any other species of the genus. This leaves us to consider only the *R. Purshiana* and the *R. Californica*, with the somewhat doubtful species of *rubra*, *occidentalis*, and *tomentella*, associated with *R. Californica*. Of these the *R. rubra* of Greene (*R. Californica* var. *rubra* of Trelease) may be dismissed with the remark that, occurring high in the mountains, out of the reach of bark collectors, and being, according to description, too low and straggly to admit of its bark being readily marketed, it does not concern us. I regret that I have no specimen of this to exhibit to you. *R. occidentalis* of Howell has not, up to the present time, been reported frequently enough to constitute an important factor in this problem; but it is not at all unlikely that future explorations will reveal its presence in sufficient abundance to indicate a danger of its collection.

Our principal task then is to discriminate clearly between the *R. Purshiana* and the *R. Californica*, with its variety *tomentella*, as it is the latter species which has constituted the entire adulteration or substitution thus far.

Considering first the botanical characters, I can say that, for my own part, I have not met with any specimens of these species about whose identity I have been in doubt. Such difficulties as do arise are caused by the tendency of *R. Californica* to vary toward *R. Purshiana*. The latter is a very well-marked species indeed, and not at all inclined to vary. The following description of it by Trelease can be accepted as well characterizing it:

"Small tree, with somewhat pubescent twigs; leaves 2 to 6 in. long, on short downy petioles, typically thin and mostly dull, more or less hairy below and on the veins above, broadly elliptical, very obtuse to abruptly blunt-pointed, rounded at base, irregularly and closely serrulate or denticulate, and often obscurely crenate; peduncle mostly 8 to 30 mm., and pedicels 4 to 6 mm. long."

Of *R. Californica* a satisfactory description is not so easily given, as in almost all of its characters it is quite variable. I, therefore, content myself with indicating the few distinctive characters between it and *R. Purshiana.*

First, I may state, as regards the regions where these plants occur, that the *R. Californica* occurs only sparingly in northern California, becoming more abundant and variable southward, and extending eastward through Arizona, New Mexico and Texas, and southward into Mexico. In the southern and southeastern regions it becomes replaced by its var. *tomentella*, which, for our purposes, need not be considered separately from the *R. Californica. R. Purshiana*, on the other hand, occurs only sparingly, even almost rarely, in Texas, Colorado, New Mexico, Arizona and southern and central California, becoming abundant in northern California and very abundant in Oregon and Washington, and extending east to the Bitter-Root Mountains. Thus it will be seen that if bark comes and is *actually collected* from north of California, it is presumptive evidence that it is genuine. The probabilities of adulteration increase with its southward sources, and if collected in, or south of, central California, it is to be looked upon with the greatest suspicion.

The dimensions of the *R. Purshiana* are ordinarily greater. Although I have found it growing to form masses of shrubbery, yet this is comparatively rare. It is commonly a tree, the trunks occurring separately. Its habitat is well described by Sargent as being "the sides and bottoms of canyons in coniferous forests." Its extreme dimensions are 40 feet in height by a foot to a foot and a half in diameter. From one-third to one-half this size is customary.

R. Californica, on the other hand, more commonly grows in copses, and rarely as a tree, its extreme dimensions being, according to Pringle, 30 feet in height, with a diameter a little exceeding a foot.

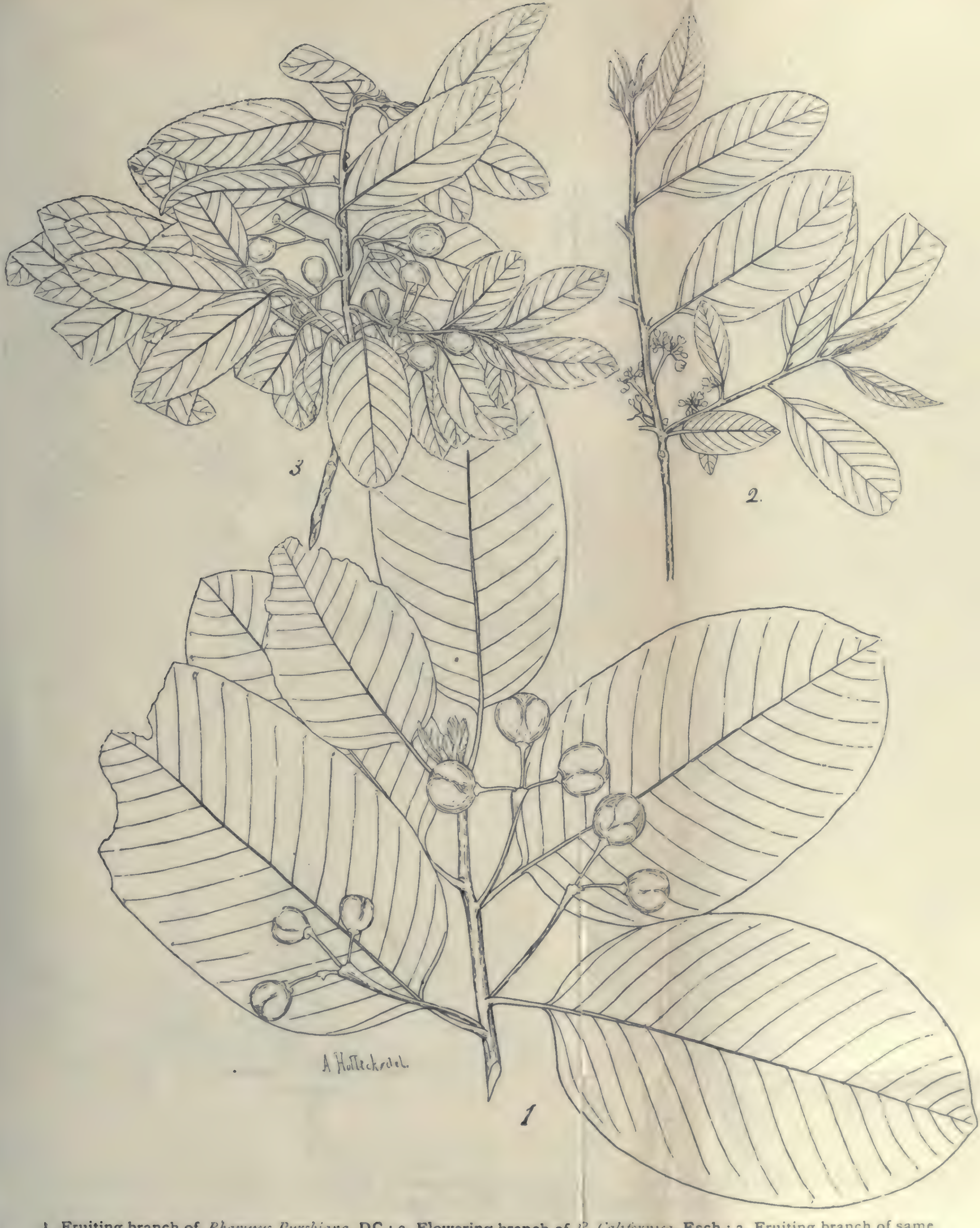
The wood of *R. Californica* is described as light, soft, and coarse-grained, with many rows of open ducts marking the annual layers, and the medullary rays narrow and obscure. That of *R. Purshiana* is light, very hard but not strong, close-grained, compact and satiny, with the medullary rays thin but numerous. These differences of structure I find well supported by those of the two barks, as will be shown later.

The characters of the branchlets cannot be distinguished in description, as those of *R. Californica*, even in the type, may be, like the petioles and inflorescence, either pubescent or smooth.

The petioles vary greatly in length, but they are commonly 2 or 3 times as long in *R. Purshiana.*

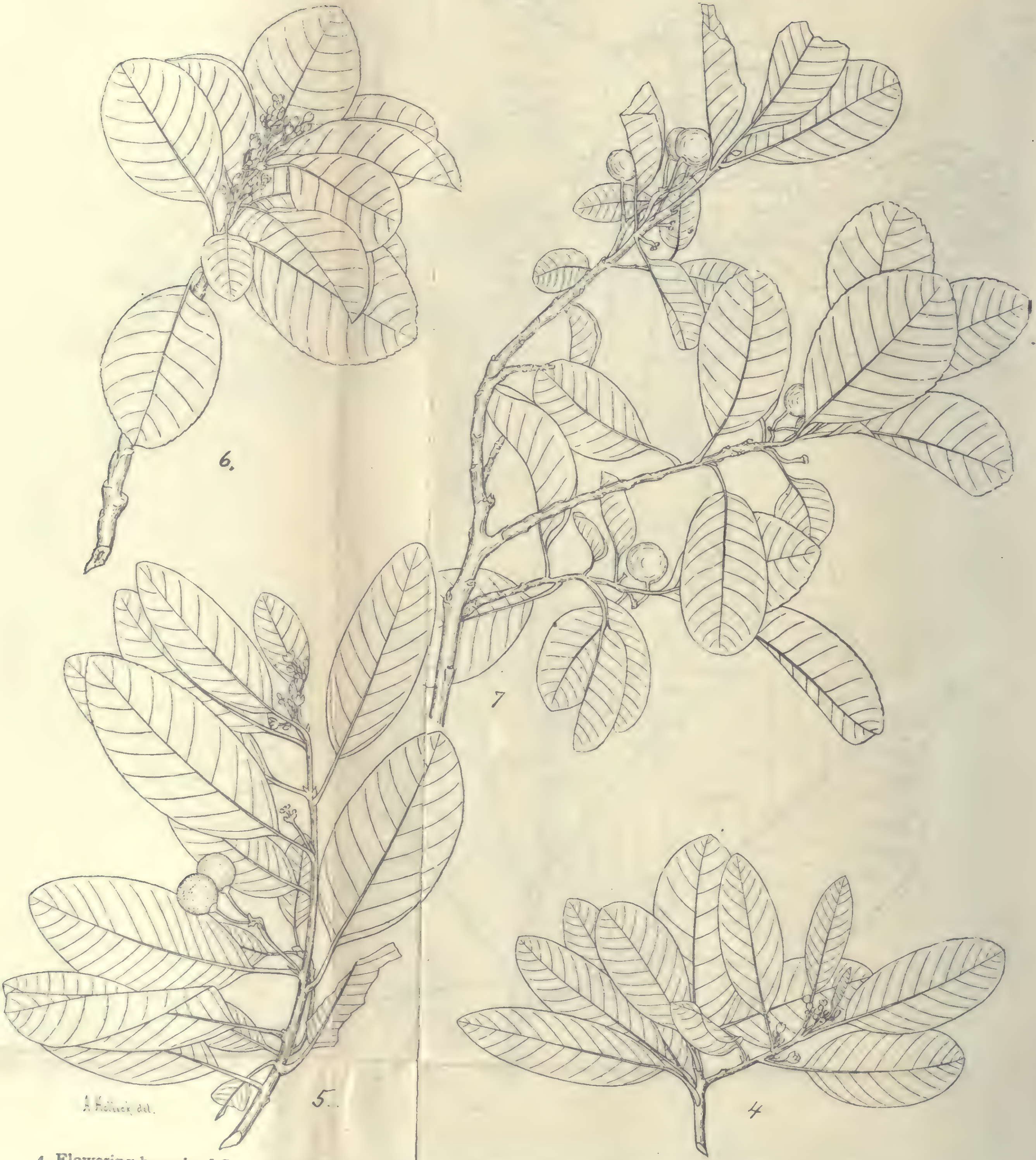
It is in the leaves that we find the chief distinguishing characters. Those of *R. Purshiana* are from 2 to 6 inches long, broadly elliptical, the base occasionally slightly cordate, but generally rounded or very slightly

FIG. 6.



1, Fruiting branch of *Rhamnus Purshiana*, DC.; 2, Flowering branch of *R. Californica*, Esch.; 3, Fruiting branch of same.
(All reduced about one-fourth.)

FIG. 7.



4, Flowering branch of *R. tomentella*, Benth.; 5, Fruiting branch of same; 6, Flowering branch of *R. occidentalis*, Howell; 7, Fruiting branch of same. (All reduced about one-fourth.)

produced, and the apex rounded or very shortly pointed. The margin varies from nearly entire to slightly crenate and finely serrate. They are deciduous, thin and veiny, green both sides but somewhat paler below. The lower surface is densely and softly hairy, the veins hirsute. The upper surface is softly hairy when young, but becomes smooth, or nearly so, except within the strong channel along the midrib, which remains reddish—or whitish—hirsute. The leaves of *R. Californica* are very distinct. Those of the var. *tomentella** are strongly whitish downy underneath, and may be at once distinguished, so that it is only the typical form with which we are especially concerned. Its leaves are only half the length of the last, elliptical oblong to obovate, rounded or slightly heart-shaped at the base, and commonly short-pointed, but often rounded at the apex, the margin varying from doubly serrate to almost entire. They are thick and persistent, generally evergreen, varying from smooth to pubescent, but the pubescence short and close, and not at all the hairiness of *R. Purshiana*. The under surface is strongly reticulate reddish-veined, and the primary veins not nearly so numerous, straight or fine, as those of *R. Purshiana*. Above, the channel of the midrib is shallow and inconspicuous, and smooth within, or there may be none. In this channel of the midrib I seem to have found an excellent characteristic.

The length of the peduncles and pedicels and other inflorescence-characters I have found too variable in *R. Californica* to yield me good characters. The fruit has been equally variable in the specimens which I have had an opportunity of examining, although that of *R. Purshiana* is 3-seeded and that of *R. Californica usually* 2-seeded.

Coming now to consider the bark, I find it extremely difficult, as already stated, to characterize its gross appearance. No description can apparently be written which will apply faithfully to all samples of one species and not to those of the other. The great difficulty is the strong disposition of these barks, particularly of the *R. Purshiana*, to become covered with a growth of lichens which mask their natural color and appearance. This natural color in the *R. Californica*, in specimens of a goodly age but still retaining the periderm unbroken, is a slightly reddish dull gray, while in *R. Purshiana*, except when old, it is of a more lustrous reddish color. This reddish color in the *R. Purshiana* appears to be deepened in some specimens grown on humid low land, and to give way to a grayish color, slightly resembling that of *R. Californica*, in those grown upon the upland. In age of course this reddish periderm becomes lost and is replaced by a roughish gray surface. Upon the periderm of both varieties, when young, occur numerous transversely elongated white or light dots. In the *R. Californica* they are far less numerous and are early lost, while in *R. Purshiana* they persist for many years. All these characters, as tasted, are more or less masked by the growth of lichens, but it is noteworthy that these lichens in the *R. Purshiana* tend to grow in conspicuous silvery patches, while in *R. Californica* they frequently form a more uniform covering.

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* Although I employ the commonly accepted name, I believe *R. tomentella*, Benth., to be a distinct species.

There is but little advantage in studying the inner surface. When freshly peeled both have a bright, yellow appearance, which soon turns darker: but in the *R. Californica* this never becomes so dark as in the *R. Purshiana*.* Upon drying, the inner surface in both becomes marked by fine striæ and blister-like papillæ. The latter are commonly much more numerous in the *R. Californica*.

It is in the structure of these barks as revealed by the microscope that we find our unfailing guide to distinction. The characters and arrangement of the bast-bundles, resin-areas and medullary rays form quite as good evidence as do the leaf characters above detailed, and guide us to the recognition of the barks alone, which the leaf characters cannot do.

The general structure of both exhibits medullary rays supported on either side with small bast bundles, circumferentially elongated, of an elliptical form. Of these there are sometimes two, side by side between two medullary rays, while at other times a single large one reaches from one medullary ray to the other. In the *R. Californica* they are more likely to occur in pairs. At the region where the medullary rays terminate, and extending from there to the corky layer, begins a zone of very large resin-spaces, (sclerenchyma) of variable size and form, but many times larger than the bast bundles, which in appearance resemble them very closely indeed. There are many other points of interest and beauty in the structure; but these are omitted, this being not a structural description, but merely an account of the prominent distinctive marks of the two barks. The chief points in the structure of the genuine bark, *Rhamnus Purshiana*, have been very well presented by Prof. Prescott in *New Preparations*, Feb. 1879, p. 27. The general features above described present the following variations in the two barks on transverse section. The inner margin of that of *R. Purshiana* is even or only slightly wavy, while in that of *R. Californica* it is quite regularly and strongly crenate, a crenation corresponding to the extremity of each medullary ray. Apparently these crenations correspond to the blister-like elevations to be observed upon the inner surface. The medullary rays in *R. Purshiana* are numerous, thin, and run on an average fully ¾ of the distance across the bark. From the inner margin to about the middle of the bark they run pretty straight and parallel, broadening markedly as they go. They consist commonly of two rows of cells. In the *R. Californica* these medullary rays are not more than half so numerous, and they are twice as broad, running on an average not more than ⅔ the distance across the bark, the shorter ones being very short. They are crooked and non-parallel from the first. They consist commonly of three or more rows of cells. Considering the inner bark as extending only to the extremity of these medullary rays, we find that the outer bark is the area or zone in which occur the large resin-spaces already alluded to. It will thus be apparent that this zone of resin-spaces in the *R. Purshiana* occupies only ¼ the total breadth of the section, while in the *R. Californica* it represents nearly ⅓ of it. Not only is this the case, but the resin-spaces within the area in the genuine bark are irregularly and rather loosely and sparsely distributed, while in *R. Californica* they are large, numerous and thickly distributed, a zone near the cork being particularly occupied by long and narrow ones. The bast bundles are quite similar in both, but in *R. Pursh-*

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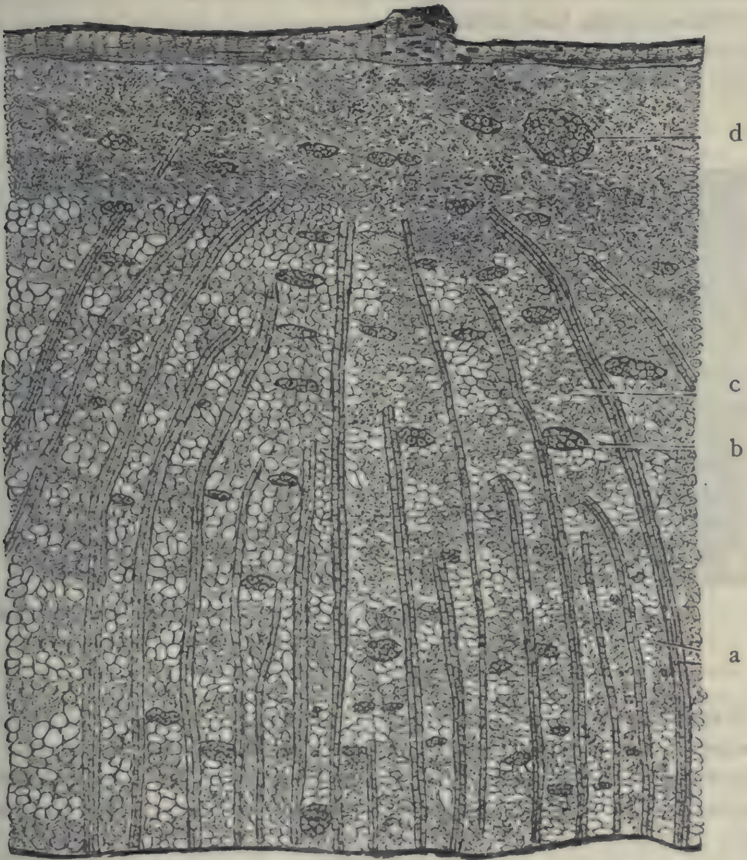
* A more extended investigation of this point since the reading of the paper indicates great difficulty in applying the principle, as the inner color depends so largely on age of tree and of the collected bark, and perhaps on the season when collected.

FIG. 8.

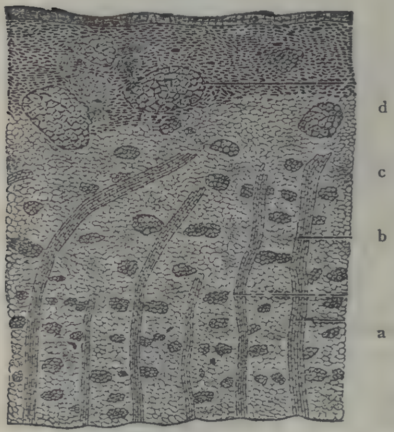


Transverse section of bark of *R. Purshiana*; a, medullary rays; b, bast bundles; c, groups of parenchymatic cells containing particles of a blackish resin; d, large yellow areas (sclerenchymatic cells); drawn by Henry Kraemer.

iana they are, owing to the greater number of the medullary rays and the narrow spaces between them, considerably smaller and more numerous. As regards the longitudinal section, the difference in the width of the zone of resin-spaces and their thickness of distribution bears corresponding distinctions. There is indeed no particular advantage to be gained, so far as I have been able to determine, from the examination of longitudinal sections, the characters seen upon the transverse as here detailed being apparently ample for the determination of any specimen.

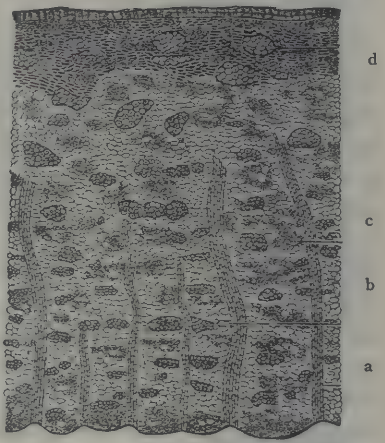
Concerning the bark of the variety *tomentella* of the *R. Californica*, the description of the latter will apply sufficiently well. No marked distinction could be made out in the structure of these two forms.

FIG. 9.



R. Californica, **the same.**

FIG. 10.



R. tomentella, **the same. All magnified about thirty diameters; drawings by Henry Kraemer.**

With regard to the bark of the third species, *R. occidentalis* of Howell, I regret that my single specimen is not sufficient for a determination. It is so young that apparently its characteristic structure has not yet become developed, and it is impossible to say whether it would present upon maturity any marked distinctions from either the *R. Purshiana* or the *R. Californica*, and if so, from which one. What little I have been able to make out would seem to indicate that its relations are rather with the *R. Purshiana* than with the *R. Californica*.

For the generous contributions of the series of specimens on which this paper is based, I am under great obligations to the following gentlemen: Dr. S. B. Morse, of Cresswell, Oregon; Mr. J. B. Groat, of Oregon; Mr. Thomas Howell, Portland, Oregon; Prof. E. L. Greene, of the University of California, Berkeley, California; Mr. C. R. Orcutt, San Diego, California; Mr. S. B. Parish, San Bernardino, California; Mr. S. H. Friendly, Eugene, Oregon; Dr. H. P. Montbourne, Mt. Vernon, Washington; Mr. R. Lafayette, Rossville, California; and Dr. D. Whiteside, New Westminster, British Columbia.

Mr. Maisch.—I am exceedingly grateful to Professor Rusby for having presented this paper to us, and I can appreciate the immense amount of work that has been done in order to ascertain these facts. It appears from the specimens which I have seen that the younger barks of medium age may be more readily distinguished than the older barks, which closely resemble each other in appearance. The younger bark—that is, bark from branches of about medium age of the Rhamnus Purshiana—bears externally a resemblance to the Rhamnus Frangula in having transversely elongated scars. But I rise more particularly to ask Professor Rusby to what he attributes the crenatures upon the inner surface of the bark of Rhamnus Californica. It is natural to suppose that attached to the tree it is of a smooth inner surface, as in other species. Is it not probably the collapsing of the tissue of the medullary rays alone which may give it that appearance?

Mr. Rusby.—Up to the time of coming here, I was unable to satisfy myself, but I take it to be caused in this way: when the bark dries, there is a contraction laterally, and those portions of the inner part of the bark between the medullary rays get forced out in a concave form, the medullary rays keeping a uniform length—as these rays are further apart in the Rhamnus Californica, and there is more tendency to dry in this way. I do not give it as authority, as I have not given it sufficient study.

Mr. Connor.—I notice one sample of the bark exhibited has a different odor. Is that a distinct characteristic?

Mr. Rusby.—It is not very characteristic, because while I believe there is a somewhat stronger or more unpleasant flavor and odor in the false bark, I have not been able to satisfy myself that it is uniform. It varies with age. You know what a difference takes place in the composition of these barks with age, and when you have specimens and do not know their age, and know that the degree of age has changed the odor, how are you going to tell what an odor indicates?

Mr. Haigh.—Some three or four years ago, Parke, Davis & Co. furnished me with a specimen of cascara to enable me to determine what its active principle is, but that I have never decided to this day. A French authority states that the cascara contains chrysophanic acid. I separated out a yellow crystalline substance, that gives reactions very similar to the chrysophanic acid, but in the combustion that I have made of this substance I believe that it contains less carbon than chrysophanic acid. I have not been able to complete my work yet and come to a satisfactory conclusion, but a number of combustions made appear to indicate emodin as being the active constituent of cascara. The resins have been separated and described in 1878, in an analysis made of the drug by Dr. Prescott in the paper that Dr. Rusby refers to. In my experiments I tried the resins in different ways, and did not get as satisfactory results as when I mixed them with some of this yellow crystalline substance.

Mr. Maisch.—Were they active?

Mr. Haigh.—They were to a certain extent active, but I believe the principal activity is due to emodin.

Mr. Maisch.—Some years ago, in the California College of Pharmacy, there was a yellow crystalline principle obtained by Prof. Wenzell.

Mr. Kennedy.—The light thrown on cascara is very important to us as pharmacists, subject as we are to the tender mercies of the trade. I speak of jobbers who handle these goods and sell them to the pharmacist, who are not themselves in a position to guard against the spurious article. I have received various specimens varying very much in their effects. Sometimes I have found a bark giving excellent results, and the next time I would have one to condemn; it has been a matter of great difficulty from time to time to get a reliable bark. Hence, I think if any definite characteristic can be given whereby the pharmacist can identify by some such means as the gentleman has laid down, the color, the various length of the medullary rays, etc., it would be exceedingly valuable. I think it is important to know, and would be glad to hear of anything being discovered that is definite.

Mr. Hallberg.—I have handled a considerable amount of cascara, and some years ago great difficulty was experienced in getting a genuine bark. I often had no difficulty in distinguishing them, but sometimes a young bark appeared, which while it had every appearance of being the genuine article, yet at the same time there was a doubt about it, because these markings in a younger bark apparently were not as prominent as in the older specimens, nor was the color of the interior surface as dark or as prominent as it ought to be. I further found, that by chewing a little the genuine bark always appeared to have a decided bitter flavor, while the substitute did not have near as bitter a taste. When I was at an absolute loss to distinguish I would make an infusion of it, and then had an examination made. I would ask, although it is not within the province of the paper, whether Mr. Rusby could at this time state the difference, pharmaceutically or medicinally, between the two barks, whether the Californica at all approaches the Purshiana in therapeutic quality.

Mr. Rusby.—That is a very important question, and the answer to it is this: all the experiments made with the false bark have been made unwillingly and unconsciously. No man has ever taken a series of false bark, and experimented with it. He thought he had the genuine article, and found out too late that he had not, so that we have no accurate data. Of course it is easy to speculate, to pick out a fact here and there, and theorize on it. But the only thing we can do now—and it is one of the things we have in mind to-day—is to obtain from reliable parties a considerable quantity of bark which certainly is false, and then have this investigated chemically and therapeutically; until this is done, I do not think we would be justified in coming to a conclusion.

Mr. Maisch.—Has Professor Rusby ever examined false bark of commerce, and compared it with the true Rhamnus Purshiana?

Mr. Rusby.—Yes, sir; I have examined a car-load of it.

Mr. Maisch.—Was it the Rhamnus Californica?

Mr. Rusby.—The Rhamnus Californica. Of the specimens of spurious bark I have seen, I have determined the source of two; one was the Rhamnus Californica, and the other was Cornus Nuttallii.

Mr. Maisch.—I had a letter some months ago from a correspondent in Europe, requesting me to send him some specimens of false Cascara sagrada, and endeavored to procure some under the name of Cascara sagrada; at that time I only got what I had to take as Rhamnus Purshiana. I have made inquiries among several parties I know who handle large quantities of the sagrada, and asked them for specimens of the false bark, but could not obtain any.

The following paper was next read:

SOLUTION OF CITRATE OF MAGNESIUM.

BY LUTHER F. STEVENS.

Upon this well-worn subject so much has been written that it would seem almost impossible to present a new phase before an assemblage of experts. The Association Proceedings have plentiful accounts of accurate detail work during years past, covering various points, well-known brands of bottled citrate, as handled at wholesale, have been shown to widely vary in actual material found; the amounts of foundation magnesium in single bottles, the percentages of gas present, the structure of the final crystalline deposit, the chemical reactions resultant from the primary operation—each and all are abundantly determined.

Theory also abounds, for we are told by most of the commentaries and text-books that the dibasic salt is the one aimed at, while occasionally another says that the tribasic is present and intended, the latter quotation in particular being often brought forward in argument against any proposition for change.

If it was intended, then the formula is decidedly incorrect, because for 200 grains of carbonate of magnesium, 290 of citric acid only is needed in place of 400.

Its presence is but too true, as is proved by havoc with over-kept stock, for in the officinal formula or any nearly following it, two-fifths of the carbonate used is turned into that the least active and most unreliable of all the magnesium salts. This is the condition even when the United States or the British solutions are newly made, while after crystallization it has become so nearly inert that it may be safely taken in quantity approaching two avoirdupois ounces. In France this form is preferably made in order to give a greater show to the patient for his money, and most of the effervescent varieties are made from the same; but in our solution we have neither that nor the better in condition to obtain proper judgment, but a mixture of the two which is advantageous to nobody, except as it may be a little stronger than the tribasic alone.

Notwithstanding the careful work referred to, no record is made upon this point, the presence of two salts; so it is to be suspected that the fact has not ere this been considered, although it is the only chemical possibility under the conditions given, which a little study of the equations will show to any chemist.

To our sorrow we must own up to the tribasic, but also at the same time acid or dibasic citrate is formed in lesser quantity, which however gradually changes from its acid character as the crystallization of the predominant salt proceeds, and though not becoming tribasic nor crystallizing with it, yet is much less active than at first, and owing to difficulties experienced in separating it *per se* from the mother liquor still containing traces of other matters, little more can now be said concerning its exact condition.

I have indulged in theory somewhat regarding that condition, but to-day wish to speak only upon proven lines, with a desire to bring into prominence the advantages possessed by the acid salt, which if it is once accepted will do away with this troublesome research.

Dibasic Magnesium Citrate, also called Hydro-Citrate, Acid Citrate, two-thirds magnesic Citrate, and perhaps even other synonyms, all being descriptive titles of its chemical arrangement, and Tribasic Citrate, or Neutral, Saturated, or Sesqui-citrate—these are the two salts which may be made by bringing the materials together in proper proportions, either as may be desired, or both at once when certain conditions are fulfilled.

The first derives its name and its greater activity as a therapeutic agent from the retention of one hydrogen unit attached to the citric radicle, the other two having been made way with by dyad magnesium.

This salt is not a recent discovery, yet from the uncertainty and indefiniteness of writers upon the subject, from the aiming, expecting and seeking so often told of, yet never producing, one might be led to think that some great mystery surrounds its source, or that, after all, it may be but a theoretical possibility not yet born from dreamland.

The formula is not secret, it has frequently been published but usually obscured in a complication not readily grasped except by trained eyes; a single molecule reads:

$$MgHC_6H_5O_7=214.$$

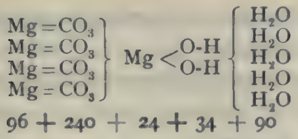
and to make it requires only that one atom of magnesium=24 shall have for combination one citric radicle which is contained in one molecule of citric acid=210, when in the presence of water a solution of the salt immediately commences to form.

Is not this proposition simplicity simplified?

ONE MG. ONE CITRIC ACID!

Then it evidently follows that if there are to be three or four or five upon the magnesium end of the equation the opposite should have equal benefit, and from precisely this point seem to proceed the troubles which so many complain of.

Without futher speculation, dealing solely with live facts of to-day we very well know that the magnesium used must come from a compound. From 40 of the Oxide 24 of Mg. is obtainable, but officinally we must handle a carbonate, and this officinal compound is not founded upon theories of fifty years ago—like many other things it has changed in its composition since then, and why this fact has so long been slighted I cannot conceive, and yet that fact is here with us and has been for a goodly series of years—magnesium carbonate of to-day carrying in its aggregation not three nor four *but five* magnesiums in a molecule of 484. $4\ MgCO_3Mg.(OH)_2 5H_2O$.



$$\left.\begin{array}{l} Mg = CO_3 \\ Mg = CO_3 \\ Mg = CO_3 \\ Mg = CO_3 \end{array}\right\} \; Mg < \begin{array}{l} O\text{-}H \\ O\text{-}H \end{array} \left\{\begin{array}{l} H_2O \\ H_2O \\ H_2O \\ H_2O \\ H_2O \end{array}\right.$$

$$96 + 240 + 24 + 34 + 90$$

Then five citric molecules=1050 are wanted to balance five atoms of the metallic magnesium, as shown in this equation which is reiterated here from the article by Prof. Patch, read last year at San Francisco.

$$4(Mg\,CO_3)Mg(OH)_2 5H_2O+5H_3(C_6H_5O_7)H_2O$$
$$=5Mg\,HC_6H_5O_7=1070+16H_2O+{}_4CO_2$$

finishing five molecules of the acid salt of which one was shown a moment ago.

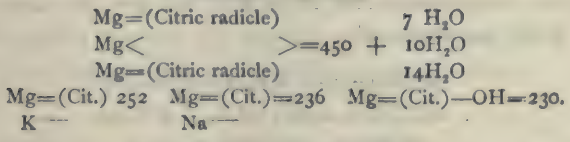
That 1070 portion is what interests us; the rest being gas and water, *it will always form* when these proportions are adhered to, or when the acid is in excess, no matter what system you may weigh in, whether milligrammes or tons; but if magnesia is given in excess saturated citrate begins to make immediately, the quantity varying with the amount of addition. When the acid salt is properly formed in solution and no free acid present, addition of carbonate or oxide will bring it down to the saturated form, but no amount of acid possible will bring it back again under the conditions which exist as officinal solution. A case I once noted, where 10.47 Mg. Carb. U. S. P. was added to a solution of anhydrous acid salt 23.37, in a day or two changed to 25 of neutral (41.88+93.48=100).

In the original process adopted by our Pharmacopœia, the first stage of operation produced acid salt in good order, but a great portion was soon saturated by the addition of Mg. Carbonate to each bottle for the purpose of gas charge.

Saturation may be accomplished in other ways also, and to this point I desire to call attention.

When any replacable hydrogens of the acid salt are driven off by other monads as Potassium, Sodium, or Hydroxyls, much of its activity is immediately lost, but Mg. is the worst, as these atoms link together two citric radicles, 420 of acid being used up to give a salt of much less value than can be had from 210.

GRAPHIC PICTURES.



$$\begin{array}{l} Mg=(\text{Citric radicle}) \\ Mg< \qquad\qquad\qquad >=450 \\ Mg=(\text{Citric radicle}) \end{array} + \begin{array}{l} 7\ H_2O \\ 10H_2O \\ 14H_2O \end{array}$$

$$\begin{array}{l} Mg=(\text{Cit.})\ 252 \\ K\text{---} \end{array} \quad \begin{array}{l} Mg=(\text{Cit.})=236 \\ Na\text{---} \end{array} \quad Mg=(\text{Cit.})\text{---}OH=230.$$

Each of the portrayed difficulties has happened ere now in recommended processes; the three last, however, do not precipitate, but in consequence of these accidents, few have produced this salt entirely pure for actual trial; hence, text books and current literature are very scant in regard to particular information.

How many here present are familiar with its peculiarities? I have been asked, "How do you know anything about it?" and told that it was none of my business, but the doctors'!

Well, I have been getting the M. D.'s to try it, other careful workers at the counter to make it, and a multitude to take it, in order that imagination should not have too much liberty.

CHARACTERISTICS.

It is pleasantly tart in the mouth, although no free acid is present.
It does not readily crystallize.
Has keeping qualities most remarkable.
Is therapeutically the most active of the magnesium salts.
It is even and temperate in large or small doses.
Is easiest made because requiring the least chemical force.
Less original material and less trouble give the same dosage.
These seven superior qualities above-mentioned make it the cheapest.

How long and how hard has our craft striven for this combination? yet these points are not matters of record as far as my research has shown, and it has taken work and exceeding care to be able to say *that they are facts*.

The Operation!—Bearing the proportions in mind, nearly everything else may be Q. S.—sweetening, flavoring, the amount of gas charge and manner of producing it, and immediate method of procedure. No elaborate routine is necessary; everything may be dumped together at once or the various steps may be separated; heat may be used for the sake of rapidity, or all will go on well at ordinary temperatures; but of course the liquids used should be sterilized before using, as organic matters break up any citrate.

So far all attention has been given to the salt and its building up, now the final charging is to be considered. If another carbonate is to be used for the purpose, then an addition of citric acid is necessary, because all that has gone in has been used up. The present method directing 30 grs. of potassium bi-carbonate requires 21 grs. of acid to each bottle; the older plan of 40 must have 28, but gives ⅓ of an atmosphere more pressure. 25 grs. of sodium bi-carbonate and 21 of acid will give the same amount of gas as 30 of the potassium salt.

$$3KHCO_3=300+H_3C_6H_5O_7H_2O=210$$
$$=K_3C_6H_5O_7=306+7H_2O_{126}+3CO_2 132$$
$$3NaHCO_3=252+\text{Citric Acid } 210$$
$$=Na_3(\text{Citric})=258+7H_2O+3Co_2 132$$

This necessary allowance is not always made; some effects following such carelessness have already been explained. It is well to place all of the acid together at first, the extra along with that for reaction.

Those who use water already carbonated and under pressure for the filling need not make this calculation.

Dosage.—This may run from 250 to 300 grains of the nascent salt (as held in solution) ; careful trials made in different neighborhoods of Brooklyn have occupied about two years to get this rating. A bottle from the U. S. formula has 363 grains of mixed salts (before crystallization commences). One of our gentlemen did very well with 238 grains—that is, he found his output matched his competitors' in effect.

For a long time I used about 258 grains, but in 1882 brought it up for certain reasons to 267½, which many of my personal friends have found to be a good average. Mr. DeForest, a member of this body, commencing with my quantity, but wishing to test the capacity of his immediate clientage, ran it up much higher, but he does not now care to go beyond 287. One gentleman for some time used 313 grains, and found need to caution his customers, and often to recommend but half a bottle.

As a "refrigerant" it also far excels the neutral citrate.

If each gentleman present will upon returning home make a small trial upon the plans here laid out, I do not think that any will care to return to the old. The quantities for actual use depend much upon local necessity, and the ratio is easily found by multiples or divisions.

Hints.—The apparently odd quantity of 267.5 grains is arrived at by dividing 1070 (the molecular product) into four parts ; multiply the same by three, and the amount is sufficient for one dozen. This medium dose, originally adopted for convenience, has proved sufficient in my own hands, although the amount of primary material for one bottle is startling to many, and has occasioned much laughter from even my friends.

	Magnesium carbonate	121	grains.
	Citric acid	262.5	
		21	
		283.5	"
Yielding:	Bi-basic magnesium citrate	267.5	"
	Saturated potassium citrate	30.6	"
	Gas as CO_2	13.2	"

As we seem about to adopt the decimal system, this by a little addition adapts readily to that method, giving about 272 grains of salt.

				Grams.
Carbonate	123.4588	grains	=	8
Acid	268.86276	"	=	17.415
	21.60535	"	=	1.4
	290.46811			18.815

	Grams.	
Ess. lemon	.50	
Syrup	40	
Potassium bicarbonate	2	
Water to finish	360	c.c.
Carbonate	100	
Acid	240	

Divide among 12 bottles. These attractive figures allow of acid sufficient to each bottle for 40 grains of potassium bicarbonate, and a trace left free, furnishing nearly 285 grains of acid citrate.

It is more precise in practice, and more rapid as well, to finish the aqueous solution and filter before adding either syrups or sugar.

For the reduction. The plan of using oxide for building up from, is by no means best, for in most kinds of chemical work carbonates are chosen; and in this case there is particular reason for so doing, first, because CO_3 is much easier to disengage than Oalone, which means that the former is on the line of least resistance, which all forces choose when possible; second, that carbonates of magnesium now average in better condition than oxide the latter being liable to degenerate.

Carbonates. Different statements are made as to structure, but in examining the sources of these I find that, as in the case of citrates, dependence is still placed upon analyses of long ago, which, however good at that time, do not fit with the present.

Theoretically $MgCO_3$ is proper, but Berzelius, in his day, found the combination to be 3 Carbonates, 1 Hydroxide + 3 waters.

The German Pharmacopœia for many years gave the formula as $3\ Mg\ CO_3.MgO\ 4H_2O$; the British, $3\ Mg\ CO_3.\ Mg\ O\ 5H_2O$, though afterwards revised to $3\ Mg\ CO_3\ Mg\ OH.\ 4H_2O$, and these seem to have been accepted sometimes one way and again the other, but little attention being paid to an oft-stated fact that before 1860, thirty years ago, Prof. Founs, of London, proved that the entire market of England was supplied with the kind explained when reactions for acid salt were under consideration, viz., 4 Carbonates, 1 Hydroxylate, 5 waters, and this is the only one we have in this country or in England, nor have I ever seen even a sample of the 4 Mg kind; our markets were examined at the time of the last revision, and the 5 Mg made officinal; as the present methods yield that kind only, so for years upon the citrate formula we have been laboring under a series of *mistakes*, and what does the pharmacist detest worse?

If our carbonate had 4 Mg the present process would give good acid citrate, though some free acid would be wasted.

The work carried on by our local committee during the past two years has proven to us that our American manufacturers are putting out much more reliable magnesia products than could be had from abroad. Carbonates from the works in South Brooklyn and from near Philadelphia gave no disturbance, while the most lauded of imported brands would sometimes "be off," and not always in the same ratio. Some variances were so great that a sample of 3 or 4 Mg was suspected, until it was discovered that the determining factor was 18 and not 24, showing that some lots have an extra hydration owing to careless handling at the finishing point. It was found, too, that *powdered* carbonate, if exposed to air during damp weather, would absorb considerable moisture: this led to the development of a relative test, having 5 Mg for standard, showing quickly and with reasonable accuracy whether the sample meets the need or not. Selected for simplicity we have had no fault found as a rough and ready check, giving the ratio of combining power between the acid and carbonate at hand, from whatever cause a variation may arise.

100 of 5 Mg carbonate will saturate 145 of citric acid, and the solution should be neutral to test paper. A table was published last fall based upon this peculiarity; 10 grs. of carbonate and 14.5 grs. of acid to be dissolved in 1 fl. oz. of water, when if additions are needed to saturate each, *one grain* indicates *10 per cent. loss.*

Mg.	Carb.	Acid.	Neutral salt nascent.	Crystallization.
24.783	100	145	155	217
	10	14.5	15.5	21.7
	1	1.45	1.55	2.17

Good workers have before now fallen very nearly upon the plan I have been recommending, viz., have found that much less magnesia than the regulation quantity would give good results; but usually they have been frightened at the idea of deviating so far from time-honored standards; and two other difficulties of which I have hinted have followed along, either some wastage of citric acid or of the acid salt, because of not being *quite* correct. From the proceedings of last year I gather that our California friends claim to make the acid citrate, but none at the meeting seemed to be able or willing to give the formula. In my collating tours the same thing has been met. The pharmacist is afraid to let it be known that he did not follow the Pharmacopœia, and more than one "receipt" has been entrusted to me in strictest secresy. The feeling is appreciated, for it was an accident which opened my eyes, and even then a long time was needed to actually shake off the fetters of superstition in which I had been trained. In the process given at last year's meeting, from the preliminary portion of which I have drawn some figures, my friend Prof. Patch adheres to syrup of citric acid, instead of putting an equivalent amount into the first lot; and also after he has produced acid citrate, and himself noted the need of a little more free acid, for other purposes, when his bottles are filled, reduces the vitality of a great portion by excess of $KHCO_3$; and even this dosage would be excessive, certainly far more than the people in my region could stand—442 as against less than 300, which has been explained as the limit arrived at from many experiments in Brooklyn.

ADDITIONAL NOTE.—Since the above paper was written I have succeeded in producing a few large crystals after patient attendance upon an ice-chest for nearly three weeks, and I send them on for exhibit if wanted. These (*A*) are just as taken from the mother liquor; recrystallization may whiten them, as the remaining liquor (*B*) after concentration almost to a jelly is darker than at first; it was not chilled, but allowed to stand quietly at the reigning temperature of the last four days. The crystals are at present quite small. The larger are best made by first finishing a strong solution containing a trace of free acid, condensing a little further by gentle heat, placing the cooled lot upon a block of ice until crystals show, and allowing subsequent growth to proceed in a cool place not in direct contact with ice. If a dilute solution of exact proportions for the acid salt is to be condensed, some tribasic salt forms, which, leaving an acid liquor, dibasic crystals grow above the layer of finer and white sesqui-salt first deposited. Two of the specimens sent have such an attachment.

(*C*) Is a mixture of the two salts (the saturated predominant) obtained by evaporating a dilute solution to a thick paste and rapidly chilling.

Brooklyn, N. Y.

MR. MAISCH.—This subject has been before the Association repeatedly, and I must confess that my idea now is that the solution of citrate of magnesium should be made fresh as near as possible. That I believe is the custom generally followed in Philadelphia at the present time, where pharmacists keep the solution on hand, made according to the Pharmacopœia, with the exception of the bicarbonate of potassium, which is added at the time it is called for; they generally make enough to last for about a week or two, and during that time the solution keeps in a satisfactory condition.

The following papers were presented, and of each a synopsis was read by the Secretary:

IODOFORM: ECONOMY IN ITS PREPARATION.

BY S. R. BOYCE, PH. C.

As the expensive ingredient of iodoform is the iodine used in its manufacture, and as this constitutes 96.69 per cent. by vol. of the finished product, it will readily be seen that its production must always be associated with expense.

In working on a new method for preparing iodoform, the difficulty we aim to overcome is the appropriation of iodine to form iodides, which are lost in, or have to be recovered from the mother liquor. The best yields I have been able to find from any of the old methods, were recorded by Hager, who uses Filhol's process and claimed 72 per cent. of the iodine appropriated. But Wilber following the same directions was able to recover only 42–53 per cent. as iodoform (Proc. Am. Pharm. Assoc., 1875, 717).

We are now prepared to formulate a method by which 98 per cent. of the iodine used is transformed into iodoform, and the reaction is completed at once without the labor and inconvenience of decomposing the mother liquor with nitric acid as in Filhol's process.

The formation is accomplished by the action of a hypochlorite solution on potassium iodide, in the presence of acetone. The chlorine and iodine change positions, forming chloride and hypoiodite, the iodine of the hypoiodite immediately uniting with a portion of the methyl in the acteone, and the solution becomes turbid from precipitation of iodoform. But the greater part of the acetone appears to be utilized in the formation of the acetates and carbonates of the alkalies present. The following equation represents approximately the reaction: $3\,KI + 3\,KClO + C_3H_6O = CHI_3 + 3\,KCl + KC_2H_3O_2 + 2\,KOH$. The operation requires no heat, and is best conducted in a tall cylindrical vessel, allowing the solution of hypochlorite to fall into the other solution drop by drop, as long as a precipitate is formed. The vessel should be large, as it requires about three parts of the former to one of the latter solution.

As it is difficult to decant the solution perfectly clear, I prefer to place a filter over the receiver, and turn on a small amount at a time, allowing it to drop as it comes through the filter. The dropping of the solution into the lower liquid agitates it, and, in addition to this, the receiver should be given an occasional rotary motion, to facilitate the precipitation and subsidence of the exceedingly minute crystals formed. The solution being mixed so slowly, removes all the danger of forming iodates.

Practically, a complete precipitation can be made in an hour, but as the last portions appear to separate more slowly, I think better results can be obtained by allowing the solution to stand longer. While at rest the solution should be protected from the light by wrapping a piece of paper around the vessel.

The solutions are prepared as follows,* special attention being given to the amount of acetone used, as experiments show that a less quantity will give proportionately smaller results.

Solution No. 1.

Potassium Iodide	Gm.	50
Caustic Soda	"	5
Acetone	"	40

Dissolve the potassium iodide and sodium hydrate in one litre of water, and add the acetone.

Solution No. 2 is the officinal Liquor Sodæ Chlorinatæ, and should be added to No. 1 in small proportions, as stated above.

In four successive operations I obtained 89–91 per cent. of the hypothetical amount of iodoform, equal to the same percentage of the iodine used. If the potassium iodide was pure, only two per cent. of the iodine used remains as iodide in the mother liquor. (Estimated by Dechan's method as modified by Dr. A. B. Prescott and W. L. Dunn, Journal Analyt. Chem., 1889, 376.) This leaves about eight per cent. of the iodine used unaccounted for, most of which is in the form of iodoform dissolved in the mother liquor.

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* Modification of a formula given by Sulliot and Raynaud, Bull. Soc. Chim., 1889. 1, 3.

The examinations of iodoform were made by filtering through counterpoised filters, pressing between bibulous papers, and drying between the folds of the filter on a wire gauze about 18 inches above a Bunsen burner, with a piece of paper suspended above all to reflect the heat. This was the most satisfactory and rapid of any device tried in drying.

Electricity was employed as a factor in the production of iodoform, and though able to produce it from all the substances tried containing iodine, either free or in combination as soluble iodides, yet the results and methods were not sufficiently satisfactory to warrant further experiment.

University of Michigan.

PHARMACOPŒIAL TEXT FOR IODOFORM.

BY C. H. WISE, PH. C.

Abstract by A. B. Stevens.

Numerous experiments were made to ascertain the accuracy of the present pharmacopœial text of iodoform. Only those paragraphs requiring any change will be considered, and they will be considered in their respective order.

Iodoform is described as small, lemon-yellow, lustrous crystals of the hexagonal system, having a saffron-like odor. This description excludes the light voluminous form which is generally preferred, as it is stated that two parts of it are as effectual as three parts of the lustrous crystals. (Gehe & Co., 1887, Am. Drug., vol. 16, p. 209). This should read: Pale lemon-yellow, bulky powder, or in small, lemon-yellow, lustrous crystals of the hexagonal system.

After careful comparisons of various samples of iodoform and saffron, it was found impossible to detect any resemblance in odor; therefore the clause, "having a saffron-like odor," should be omitted.

Iodoform shaken with distilled water should not change the color of blue litmus paper, and when filtered, should give no precipitate with nitrate of silver (abs. of iodide). After numerous trials I was unable to obtain a sample that did not give a cloudiness with nitrate of silver, and this is confirmed by the experiments of others. (Vulpius, 1883, Pharmaceutische Rundschau, 263; Conrad, Proc. Mich. State Ph. As., 1886, p. 159). Therefore the clause referring to the behavior of iodoform with nitrate of silver should read as follows: The filtered solution should not give more than a perceptible cloudiness with nitrate of silver.

There are frequent reports of the adulteration of iodoform with picric acid, and as they so closely resemble each other in color, solubility, etc., a test for picric acid should be added, and I would recommend the following: Take a few drops of the filtered solution, shake with water, evaporate to dryness, and moisten with a few drops of ammonia water. A particle of cyanide of potassium added to this should not produce a red color.

The following test for identity should also be added: On heating an alkaline solution of resorcin with a very small quantity of iodoform, a red color is produced. As iodoform is decomposed by strong light, it should be kept in a cool, dark place.

University of Michigan.

THE FLORIDA PHOSPHATE FIELDS.

BY H. ROBINSON, M. D.

During the summer of 1887, whilst a U. S. Government survey was being made of Peace River, Fla., which is situated in the southern part of the State near Charlotte Harbor, two members of the surveying party were attracted by the peculiar pebbles abundantly found in the bed of the river. They sent some of the pebbles to a chemist to be analyzed; on receiving a report that these specimens were phosphate coprolites they made a more extensive investigation, and to their gratification found that the supply of coprolites was immense. They then quietly purchased the greater part of the land embracing the banks and bed of the river, made arrangements with fertilizing companies for the disposal of the phosphate, and proceeded to erect works for mining it. Their operations attracted but little attention either at home or abroad; they in the meantime amassing a fortune.

In June of 1889, a farmer at Dunellen, a village in Marion county, was digging a well for water on his homestead, and as he had an idea that his land contained gypsum, he carried some of the rock that was thrown out of the well to Ocala, the county seat, and showed to Mr. Snowden (a graduate of the N. Y. College of Pharmacy) the specimen of the so-called gypsum. Mr. Snowden made an analysis of the rock and ascertained that it was composed principally of phosphate of lime. This important discovery was communicated to Mr. J. F. Dunn, (a capitalist of Ocala) who sent some of the specimens to a St. Louis firm of chemists, for further analysis.

Their report confirmed Mr. Snowden's analysis, and recommended that further search be made; whereupon Mr. Dunn purchased through his agents thousands of acres of land at nominal prices, from one dollar to five dollars per acre, till he controlled as he supposed all the land that was likely to be underlaid with phosphates.

About the beginning of the present year he made his discoveries and purchases public, whereupon an excitement arose throughout the State, that can only be compared to the gold discoveries in California. Old and

and young, black and white, males and females throughout the whole State abandoned their usual pursuits of life in search of phosphates. The whole State was honeycombed with auger-borings; pits were dug in every field.

As a result of these borings it was demonstrated that the phosphate fields in Florida were practically unlimited; the mineral underlays pretty much of the whole State. Lands that sold last autumn at a dollar an acre sold readily for $50 to $100 per acre. Eager buyers from every part of the Union rushed into the State, and purchased without even an examination of titles or a survey of the lands, paying any price asked rather than lose the opportunity. Yet none have regretted their investments. Vast sums of money changed hands and more discoveries were being made. At the present time (June 1890) the fever has somewhat abated, but it is still raging fiercely. Large investments are yet daily being made, but more judiciously than before; locality and transportation facilities are now considered as a factor in the price of lands, and values are becoming more stable.

The Dunellen Phosphates (so-called because first there discovered) are found principally in the southern portion of central Florida, comprising the counties of Marion, Citrus, Levy, and Alachua, also Lafayette and Waculla counties. This non-metallic mineral is in appearance usually perfectly white, similar to limestone rock. It is composed of, on an average, bone-phosphate of lime 75 to 85 per cent., and alumina and iron oxide each from 2 to 3 per cent., and the remainder of carbonic acid and silica.

There are also in almost every other part of the State, pockets of a similar formation of a lower grade; and marl beds, containing about 10 to 20 per cent. of phosphate of lime, are in great abundance everywhere

In the southern part of Marion county and the northern part of Citrus county adjoining, the Phosphate rock extends from the surface, or 1 or 2 feet from the surface, in solid beds from 5 to 20 feet underground in depth. That obtained from the surface of the land is usually laminated, of a grayish-white color, of very high percentage of phosphoric acid; lower down the rock continues to show evidence of lamination, and is of snow white color; as we proceed, however, 10 to 15 feet underground, all evidence of lamination disappears, and the rock, still white, is soft, and has the consistency of chalk—it then contains a larger quantity of carbonic acid and less phosphoric acid.

The theory of its formation advanced by some scientists is that the whole section of Florida where this variety of phosphate rock is found, was, when under water, in the tertian epoch, underlaid by the so-called Vicksburg Limestone, became saturated with the urinary and fecal deposits of marine animals and fishes, and that the remains of these animals and fishes were imbedded in the limestone, and thus the rocks were gradually phosphatised. This theory does not seem plausible, for it presupposes that the affinity of lime for phosphoric acid is greater than it is for carbonic acid, which has not been proven.

This variety of phosphate rock is, by the aid of pickaxes, mined in large boulders, frequently weighing from 500 to 1500 pounds each. This is loaded in freight cars and shipped to be manufactured into soluble or acid phosphate for manuring purposes.

In the counties of Polk, Hillsborough and some other counties, the phosphate is intimately intermixed with sand or clay, and can be made available only by separating the phosphate from the matrix by the use of hydraulic power, which, as yet, has not been attempted.

In the county of De Soto, which is traversed by Peace River and its tributaries, the soil, either sandy or clay, is loosely mixed with large quantities of coprolites. No white rock like it in other parts of the State has been found.

Peace River is a shallow and tortuous stream; its bed and banks are formed of nearly equal parts of fine sand and phosphatic coprolites. The coprolites are of a dark color, either blue or gray, very hard, of smooth texture, and vary in size from that of the smallest millet seed to that of a hen's egg. The average percentage of bone phosphate of lime of these coprolites is about 65 to 75. There is no question as to the origin of the deposits. They bear every evidence of being composed of fecal matter exclusively. Large beds of bones, some of gigantic size, are frequently found in or near the river; some of these bones were evidently those of elephants and mastodons. Shark bones and teeth are very abundant in the river bed, also those of the manatee and alligators.

In the bed of the river are frequently vast banks of sand and coprolites intermixed, in about equal proportions. They vary from a few yards to a half of mile in length, and from 5 to 15 feet in height, protruding out of the water. The bed of the river has been dredged for 18 feet below the water and the supply of coprolites has increased as the dredging progressed. During rains the coprolites are washed out of the lands and little streams tributary to the river, into its bosom, and thus the supply is continuously increased.

The mining of this phosphate is done with dredge-boats only. A rubber suction pipe capable of lifting a ton of matter every three minutes is attached to the rear of the boat; this is lowered into the water, the sand and phosphate lifted is put into barges, carried to a mill, thence elevated and emptied into a screen, and sifted so as to separate the sand from the coprolite, then lowered into a railroad car, and shipped to be manufactured into the surperphosphate of commerce.

ANALYSIS MADE BY THE WRITER OF A CHOICE SAMPLE OF LAMINATED DUNELLEN PHOSPHATE.

Lime	53.31	per cent.
Phosphoric acid	33.40	" "
Sand	6.32	" "
Iron sesquioxide	3.05	" "

Alumina	2.40	per cent.
Carbonic acid and loss	0.72	" "
	100.00	

ANALYSIS OF AN AVERAGE SAMPLE OF PEACE RIVER COPROLITES.

Lime	58.40	per cent.
Phosphoric acid	27.70	" "
Insoluble matter and sand	9.60	" "
Sesquioxide of iron	1.85	" "
Alumina	1.40	" "
Carbonic acid and loss	1.05	" "
	100.00	

Jacksonville, Florida, July, 1890.

ALLOTROPY OF SILICON.

BY HENRY C. CUSHMAN.

The genial rays of the sun kiss and then catch up into the clear blue sky the vapors from the mirrored surface of all waters, which in time are condensed by heaven's alembic, and descending as rain to permeate the dark recesses of the earth, carrying with it the solubilities either to form the flint rocks, that will send a spark upon the tinder to light up our domestic hearth-stone, the metamorphic rocks of the everlasting hills, or the sedimentary sandstone or mere earth-clod, that crumbles at a touch.

Some of the pluvial supply will, in its course, dissolve out or act upon mineral deposits, and collect into springs and underground basins of medicinal waters, and may be termed natural prescriptions, written or prescribed after an infallible diagnosis, by nature's great physician, and then compounded in nature's subterranean laboratories, where the valetudinarians may quaff the health-giving beverages as well as bathe in the Bethesdan pools.

Much of the rain-water runs down inclined surfaces directly, or by rivers and tributaries to the great tidal basins—each stream carrying traces of minerals taken in its course from the soil, such as chloride sodium, carbonates of potassium, lime, magnesium and iron, and when deposited in the great "caldrons of Mother Earth," they are agitated and mixed by winds, tides and the laws of affinity, and thus is formed the chemical food for sustaining the plant and animal life in the waters upon our globe; and at the same time and in this way, the waters are unloaded of salinity until within an established limit, and are not becoming more salty or impure from accumulation.

Analyses from time to time would prove that there is an equilibrium or rather a limit founded upon the seas and established upon the floods by the high and mighty Ruler of the universe, who holds the winds in his fist and the waters in the hollow of his hand.

The reason water is so freely mentioned in this paper is because of the all-important metamorphic action it exerts with acids and alkalies in the formation of the various modifications of silicon, from the commonest parts of the earth's crust to some of the most beautiful crystals and precious stones.

Nature ever provides with a bounteous hand, and, as a general rule, where there is greatest abundance of a natural substance, it is most needed. Silica forms about one-half of the earth's crust. Suppose we illustrate how common sandstone, the flint nodule, and crystal quartz are formed.

By the action of the rains, frosts and streams, the rocks are crumbled, being divided as the water freezes within the pores and cavities, when fragments are dislodged and washed down by the streams into the seas, and into the valleys layer upon layer. Some of the streams dissolve out carbonate lime, iron, potassium and magnesium from the soil over and through which they flow, and these alkaline carbonates in solution act as a partial solvent for the silicious sand and diatomic crusts as well as the silt which settles down filling the interstices, and thus a natural cement or concrete is formed, and by accretion and pressure of the accumulating super-strata, the sedimentary rocks are formed, such as the friable sandstone to the quartzite.

Next let us see how the flint nodules are formed. Whenever impalpable quartz sands or diatomaceous earth* by the force of the winds and waters drift into layers or become mixed with what is called lime or organic rocks,† the waters permeate and dissolve the alkaline constituents of the limestone, which in turn dissolves the quartz sand and diatomic shields, together with the various coloring infiltrations, and wherever there is a space or cavity within the chalk bed, caused by descending or ascending water through the mass, the more soluble parts are dissolved out, thus leaving spaces or cavities into which the silica in solution will flow and fill the cavities, exactly conforming to the size and shape of the space, be it grotesque or symmetrical.

I have two pieces of cylindrical flint, molded in holes bored in chalk beds by the club-shaped pholades.

The coloring matter of the flint nodule is produced by silicate of iron and varies according to the admixture and degree of oxidation. Flint rocks from the ocean are formed in the same way, *i. e.*, in the cretacean beds of the sea floors, and seem to be a connecting link between the sedimentary and organic series. We come now to consider silica in the higher crystalline forms, from quartzite to the most beautiful gems that adorned the Aaronic breast-plate upon the ephod of the precious twelve tribes of Israel, or the royal diadems of earth, as well as eleven-twelfths of the pure foundation stones of the New Jerusalem.

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* Richmond, in this State, is built on a stratum of diatomaceous earth 18 feet thick.

† The chalk beds of Dover, England, consist of calcareous strata with an occasional ayer of nodular silica.

In the beginning God created the universe of "suns, worlds and adamantine spheres, that wheel unshaken through the void immense." Our planet gives evidence of great internal heat, so fervent that the surrounding earth and rocks are melted; and whenever the heat should fall below the point of fusion they crystallize, and when the heat rises again they are remelted, and so on till by frequent fusion and crystallization, each time of melting and cooling, the impurities are excluded, so that, as in the diamond (carbon) and crystal quartz (silicium), the internal heat and other conditions are not sufficient to destroy these gems of purity, but will complete the isolation by burning away the dross.

In less heated places the lower grade of crystallization is formed, down to common quartz, granite, porphyritic, trappean, gneiss, and volcanic rocks, and lastly down to scoriæ. The operation of purifying the crystalline salts by oft-repeated solution, filtration and crystallization, affords us a partial example or idea how the pure diamond, sapphire, topaz, etc., are formed, not here on the surface, but,

> Away down deep, where the eternal fires glow
> With fervent heat, the elements melting flow,
> No alchemist may the fi'ry furnace tend
> Nor watch the molten stones into jewels blend.

Take a silicious pebble from the Arctic Sea, a flinty nodule from a cretacean bed of North America, chalcedony from Bithynia, quartz sand from the plateau of the Atlantic Ocean or from the deserts of Arabia and Africa, crystal rock from the Pacific gold field, opal from Hungary, jasper from Egypt, agate and carnelian from Scotland, amethyst and sardonyx from India, emerald, chrysolite, sardius and topaz from Brazil, jacinth or hyacinth from old Ireland, and beryl from the United States, and compare them to the tripoli of Africa, or to amorphous silicon obtained by precipitation with an acid from alkaline solution of the spongiadæ taken from the waters of the Mediterranean, Arabian or Caspian Seas, or from the Indian or Grecian Archipelagoes, or from the coral beds of Florida: then behold the wonderful allotropy of the seemingly inert silicon. And yet the difference in appearance of ordinary marine sponge from the crystal quartz is not greater than the physical difference in members of the natural order bromeliaceæ,* for instance, Tillandsia usneoides (Florida long moss)† and Ananassa sativa (the delicious pine-apple).

The spongiadæ are zoöphytes, and inhabit both fresh and salt water. A microscopic examination of ordinary sponge reveals an anastomosed framework with calcareous frustules and spicules of silicate of lime, entangled in the meshes of what we will now call flint wool, for it is composed of over

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* Named after Olaf Bromel, a Swedish naturalist.

† Called after Prof. Tillandsius, of Abo, in Finland, who having a dread of water, would make long overland journeys rather than cross water.

50 per cent. of the silicates,* combined with animal gelatin and a trace of iodine, bromine, sulphate and chloride sodium.

To obtain silicon from sponge, first remove all extraneous matter, then wash with a hot solution of carbonate sodium, rinse well, then digest in dilute nitric or hydrochloric acid to remove any calcareous matter, wash again, and dry. Weigh 30 grains of the well-cleansed sponge, dissolve by heat in 2 ounces of a 5 per cent. solution of hydrate potassium, add 2 ounces water to the potassic solution of sponge, then 2 ounces dilute nitric acid, when there will be an evolution of sulphuretted hydrogen and hyponitrous acid gas, the oxyhydrate of silica will precipitate and settle at the bottom of the vessel; the supernatant liquor contains the soluble nitrates with the spongin, and when evaporated produces long translucent, yellowish striated crystals of the rhombic system.

The precipitated amorphous silica is to be thoroughly washed and then dried at a high heat. Though silica is little used as a therapeutic agent, yet it is not only a most valuable element, but is absolutely a necessary constituent of many organic and inorganic substances. It has been said, "No phosphorus, no brains;" and we might say with equal truth, "No silicon, no phosphorus," for if no silicon, there would be no cereals to furnish us the phosphates. No silicon, no glass nor glassware—and how could we do without glass?

How could the astronomer, without the silicious lens of the telescope, look up and measure the vast distances of the sun, moon and stars, and then tell us in familiar speech the wonders of the sky?

Or how could we look down into the hidden mysteries of earth without aid of the microscope, to see and know the tiny foraminacæ and diatoms that take from four to eight millions to make a cubic inch?—so very minute that to them a dew-drop is as a billowy ocean.

The following are ancient domestic remedies, and the wisdom or absurdity of each speaks for itself.

Chip a piece about the size of a penny from a grindstone, and crush to fine powder, and take in a little water after meals, for heartburn, dyspepsia, etc. The ancients drank the water from the trough under the grindstone, while the axe was being ground, as a lithontriptic.

The precious amethyst was pulverized and given as an absorbent and corrective in diarrhœa. It was worn as an amulet to prevent drunkenness, and as the ancient Persians worshipped at the shrine of Bacchus, they tipped their amethystine cups and sang praises to the wine that cheers, but not intoxicates.

The opal, ruby, carnelian and topaz have been used for all the ills that flesh is heir to. We read also that the amulet of the ancient Egyptians for arresting hemorrhages, was the beautiful ribbon jasper stone. And so on down to modern times we find the silicates of iron, lime, magnesium, potassium and sodium, used for antiseptic and mechanical bandages, inflammation, ulceration, softening and other diseases of the bones, inflammation and ulceration of the glands, felons, mild and malignant suppurations, constipation, leucorrhœa, and as a deodorant in many diseases.

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* It is supposed that the ancient flint deposits are the metamorphosed diatomaceæ and spongiadæ, and the microscope reveals abundant circumstantial evidence in favor of the supposition.

In fact, silica is of so much importance, not only in the works of nature, but in art,

> "It lends enchantment to the view
> And colors of varied hue."

A great artist painted the grandest masterpiece ever exhibited to mortal eyes; above is the grand dome, with a background of celestial blue, bedecked with myriads of bright and twinkling stars; beneath is the landscape, and whether clothed in vernal beauty or summer's riper hue, whether in garments of gold or brown, of autumn's dying shades or in winter's white and fleecy robes, it has none the less of beauty from the Master's touch. No hall of art or palace wall could contain this panorama of earth and sky; it hangs unframed upon the walls of the universe of God—a macrocosm of art, illuminated by the great and central solar lamp of day, and by the soft and mellow light of gleaming stars and mirrored moon by night, that we might view the wondrous work and glorify His name.

Let us imagine the great painters of earth, in rapt admiration, watching the splendors of an evening sun, in his play of colors, changing from beauty to beauty; or at the rainbow in its water-colors, blended in chromatic splendor, spanning the arched vault of heaven. They turn their wistful eyes back to earth again, and search for tangible pigments to match those celestial shades, where in the mountains and hills, valleys and caves of earth, they find rich stores of silicious paint in model colors, and gems of beauty, which serve as object lessons, to excite us to wonder, love and praise.

Pensacola, Florida, August, 1890.

THE CHAIRMAN—The remaining business left to the Section is action on the recommendations contained in the Chairman's address. There was a recommendation that a committee of three be appointed to procure queries for the ensuing year. Before naming that committee I would explain that the object is for its members to confer with as many members of the Association as possible, and get them to suggest subjects which they would like to have considered, and such as they are willing to write upon for this Section. Hereafter the Chairman will appoint this committee at the opening session of the Section on Scientific Papers. This year I will appoint Messrs. Stevens, Finlay and Connor.

The new officers of the Section were then installed, and the newly elected Secretary, Mr. Hallberg, in responding said:

Mr. Chairman, and Gentlemen of the Association: I am sorry that Mr. Patch is not present, because my modesty forbids me to bear the double honor of replying for the two new officers of this Section. But, under the circumstances, I am glad we have got through with the work of this Section, as much as I have enjoyed the proceedings while it has been in session. I hope that next year the officers of the Section will be able to make as good a record, and secure as large a number of valuable papers as have been presented this year, and have them as comprehensively discussed as they have been at this meeting. If that should be the result, I for one should certainly feel that the position has been exceedingly pleasant and profitable to me. I would like to take this opportunity to ask the members for assistance upon a query which has suggested itself to me this afternoon, and that is a collective report referring to the branches taught in the grammar and high schools in different cities throughout the country. I have already been promised the Annual Reports of the School Boards of Philadelphia, New York, Boston, Pittsburgh, Omaha, St. Louis, Dallas, Tex., and others. It strikes me that it would be a good thing for reference to have a tabulated statement of the branches taught, and, if possible, also the status of education, you might say, in these various cities. It is only a question of time when the colleges of pharmacy will require a preliminary education—some of them already require it. It is only a question of time, when it will be attempted to incorporate the apprenticeship system into the pharmacy laws; and a statement of this kind, I think, would be valuable as a matter of reference. As the labor involved will not be very great, I should be glad to collate such a report, upon receiving the annual reports from the various cities (which will be sufficient for the purpose) from any member who will be kind enough to send them to me.

Mr. Finlay—You have reference to high schools, public schools, academies, etc?

Mr. Hallberg.—I think the grammar schools and high schools would be sufficient. The lower grades would not be necessary.

Mr. Patch requested me to ask the following gentlemen to constitute themselves a sort of advisory committee for this Section during the year to see members with reference to receiving papers:

New York, Messrs. Eccles and De Forrest; Baltimore, Messrs. Dohme and Culbreth; St. Louis, Messrs. Whelpley and Good; New Orleans, A. L. Metz; Wisconsin, Adam Conrath; Cincinnati, Messrs. Lloyd and Simonson; and as Associate of the Committee, J. R. Tucker, of Boston.

Mr. Whelpley.—I desire to say, in yielding up the emblem of office, that I feel very grateful to the members of the American Pharmaceutical Association for the kind and unanimous assistance they have given in furthering the interests and objects of this Section of the Association. As stated in a few words in the annual address, I consider this the most important Section of the Association, and as the one nearest in its objects to the original purpose of the Association when it was founded thirty-eight years ago. I thank you one and all for the generous assistance you have rendered me, and I hope that my successors in office this year, and for all time to come, will meet with the same hearty co-operation.

Mr. Maisch.—Mr Chairman, I rise for the purpose of moving a vote of thanks from this Section to the retiring officers. They have done their work well, and all of us who have come to this meeting are certainly satisfied with the results.

The motion was seconded, and the question being taken by the Secretary was carried unanimously.

The Section then adjourned.

MINUTES

OF THE

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

The Section was called to order by the chairman, P. W. Bedford, at 8:40 p. m., on Thursday evening, September 7,—A. B. Stevens, Secretary. The Chairman read the following address:

There appears to be a growing desire among the younger pharmacists of our land to perfect themselves more thoroughly in their chosen calling, and this is attested by the increased attendance in our colleges and schools of pharmacy. The signs of the times indicate that there are many young men of good intellect and mental caliber to aspire to make pharmacy a legitimate pursuit, and seek to place the practical side of pharmacy before their allies, the medical profession, as also before the public. The fact that there is no compulsory apprenticeship in our calling is no more strange than is the same theory in other branches of industry, where in times past the young men were indentured and bound as fast as the modern terms of a contract express the relations between the mortgager and the mortgagee. Yet in our business, as in the trades and industries, other methods have taken its place, and the clerk receives instruction from some perhaps more perfect method, and in the end becomes more thoroughly fitted for his future than by the methods of the earlier times.

Colleges and schools of pharmacy are wide awake to the needs of both the popular and scientific sides of our calling, and the past year has made marked advances in methods and results. We note an increased quantity of time given in the curriculums of these institutions, and also improved methods in a number of instances; so that the young man is more thoroughly provided with information which shall be available, than were the students of even five years ago. The employer demands a better qualification, and, as a rule, the graduates of our colleges have the preference in such selections. The intelligence of the collegiate pharmacist usually makes him the safer substitute for the employer in his absence, other things being equal.

We call attention to the fact that the science or theoretical portion seems to be prominent in some institutions, and would suggest that while this is very essential to the clerk or proprietor, yet our daily avocation is of that nature that we cannot sacrifice theory to practice, and place science so far to the front that the young man may readily master the most abstruse problems of specific gravity, and yet fail to know how to make an emulsion or a pill-mass. It is the happy blending of theory with practical experience that evolves the kind of assistants that are helpful, and we emphasize the necessity of the practical side of pharmacy. With thirty-one colleges and schools of pharmacy, we have apparently a full supply to fill all present demands of even our 60,000,000 of people, with our Canadian brethren added to that, and the co-operation of employers might add largely to the present attendance of students without requiring more colleges or schools, and provide better education to those who seek to obtain certificates of qualification by cheaper and quicker methods.

The problem of the present to solve is to make our educational opportunities in pharmacy more attractive by their greater popularity with the employers; and to this end all colleges and schools should make the way for good work and profitable study coincide with usefulness of the clerk to the employer during his college course. It is no purpose of the writer to present any lengthy paper on this subject, or to add to his report of a year ago statistics or facts that are patent to all. It is conceded that every method which enhances the value of a lifetime should be encouraged, and if so certainly there should be such encouragement extended practically to the student of pharmacy. It will avail this body nothing to resolve and then neglect to do; neither will it do to express our opinions, and then each one say that I must conduct my business that I may avail myself of all the labor I can obtain from my employee, but at the same time curtail his opportunities for improvement. This address is purposely made brief that in the short time that is at our disposal for business, papers and discussions, opportunity may be had for a full discussion of the papers that have been promised and the discussions they may evoke.

On motion of Mr. Remington, the address was referred to a committee of two for consideration, Messrs. Shinn and Canning being appointed by the chair.*

The following paper was read:

HOW MAY PHARMACEUTICAL WORK BE MADE PRACTICAL?

BY H. H. RUSBY, M. D.,

Professor of Botany and Materia Medica in the College of Pharmacy of the City of New York.

In attempting to throw some little light upon the very important question of which my paper treats, I express the hope that it will elicit a free discussion by the teachers among us. The profession of the teacher is a liberal and a generous one. We at least have no secrets; but we must all have ideas concerning our work which can be promulgated with mutual advantage; and such occasions as the present we should make the most of.

As a rule, advanced students are the most neglected class of students, and that which we call higher education is high only in the sense of treating of advanced subjects, its strictly educational features being most incomplete and unsystematic. As a preparation for instruction in the humblest primary school, a thorough course of training in the theory and art of teaching is considered indispensable; but in much of our professional instruction it seems to be lost sight of that there exists a science of education—just the same as a science of chemistry, of physiology, or of botany. the mastery of which is an important, not to say necessary, preparation for a successful teaching career. The teachers in our public schools organize district and city, county, state and national associations, where they periodically discuss, not the subjects which they are called upon to teach, but the teaching of those subjects; and where effort is directed, not so much toward the discovery of new truths in general science, as of improved methods of presentation and new apparatus or device for illustration. But professors in colleges, and this is more particularly true of those in medical colleges, content themselves too much with the pursuit of their own investigations, and proceed to the work of teaching merely because they are proficient in the particular branch of science represented, and frequently totally devoid of experience in teaching, of knowledge of the fundamental principles on which the art depends, and, in short, with the most meagre qualifications for successfully imparting to those dependent upon them, the rich stores of knowledge which they themselves possess. Under such conditions a large part of their effort is wasted, and a considerable proportion of the money annually expended in professional education is practically thrown away. The student must have some definite object in attending upon courses of lectures in preference to studying his text-books at home, and this object must be the gaining of some special advantage by that method. Such advantage he can gain only by virtue of some special effort put forth, or some special device resorted to by his teacher to the end of enabling him to acquire the utmost possible at the least expenditure of time and effort, and in such a manner as is best calculated to prove of future utility. But these particular accomplishments the teacher is not at all likely to stumble upon. The laws under which he is to work are as old as the human intellect, and their study is the most profitable means toward the accomplishment of the end sought. It is upon these same fundamental principles that all successful teaching must be based, although we have various systems to choose between, and the methods are as varied as the nature of the student and his surroundings.

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*The committee subsequently informed the Permanent Secretary that they could see nothing in the two adddresses requiring action on their part, no recommendations having been made therein.

In the absence of any extended experience as a teacher of students of pharmacy, I should hesitate about offering my small contribution to this subject but for the fact that the methods to which I solicit your attention are the result of extended study of the theory and art of teaching, and a long experience in the work in other fields.

We find the following conditions confronting us in our work in the college of pharmacy:

First, we are preparing men for a business not sufficiently remunerative to warrant them in devoting the long years of preparation customary for the professions of theology, medicine and law. For this reason chiefly we can never hope to secure classes composed largely of college graduates, or of men and women—for we are to see more of the girl student in the future than we have done in the past—skilled and disciplined in the art of study; a most unsafe class, therefore, to be left to their own devices in this matter. If we would make the most of them, we must do much of their thinking for them so far as relates to methods of study, and we must walk with them at every step and be ever watchful to guard them against the errors and oversights that more experienced students would of themselves avoid; and not only against errors and oversights, but against deliberate omissions as well. For our young man has not only not yet acquired the best habits of studying, but in very many cases he has not learned that study is not a hateful drudgery, and has not reached the point where he can be trusted to apply himself with faithfulness.

To meet this condition a faithful application of quiz methods is the most efficient artifice that we can employ. It is here not only that the student is to receive a constant review of the subjects which he has passed over, but where we are to indicate to him by the nature of our questions those portions of his subject which are of greatest importance, and to train him in the art of utilizing the results of instruction gained in the lecture room. The professor should work closely with the quiz-master; should accompany him at times into the quiz-room, and express a lively interest in all that he does. He should at times institute extemporaneous quizzes of his own, and should always be prepared to discuss with his students the practical application of his teaching, not only to the work of his own department, but its relation to the teaching of the associated chairs. Too close a relation cannot grow up between the professor and his students; and the quiz-class cannot be too assiduously cultivated.

Of eminent advantage in the same direction is the arrangement of the different courses of instruction so that they shall fit properly into one another, and so that the entire course of the college shall constitute one regularly graded and harmonious system of instruction, the same as it does in other schools, and with us even more important than elsewhere.

The necessity of making the lectures attractive requires no comment. Only the most attentive and eager of students can sit with profit under a dry and unattractive lecture, droned forth without illustration or attempt at ornamentation.

A second element of difficulty with us is the shortness of the ordinary pharmacy course. There is scarcely time for thoroughly working the half of the ground that must be gone over, and there is the utmost necessity for unflagging application and a perfect atmosphere of earnestness and thoughtfulness.

We have to consider, moreover, in selecting our subject matter and adapting our methods, the precise object which the student of pharmacy holds in view. Surrounding himself as best he may with the conditions for culture and refinement, his course of study is nevertheless not designed for culture nor general discipline. His objects are purely technical. His design is to fit himself for a business, partly professional it is true, but largely commercial, where he is to engage in a fierce conflict. for a livelihood, and where he cannot afford to sacrifice too much of the actual technical details of his business for the pursuit of the associated enjoyments of pure study. Bearing this thought, in connection with that of the short time at our disposal, steadily in mind, we must do two things, and do them relentlessly.

First, we must eliminate from our course of instruction everything of a purely elevating nature, the presence of which would necessarily displace any instruction on which the business success of the young man shall in any measure depend. Instruction of a higher order must of necessity be withheld until the time shall have arrived when our colleges generally shall provide post-graduate courses of instruction.

Second, we must, in presenting such subject matter, leave nothing to the imagination, but present it all in the most realistic manner that it is possible for us to devise under our respective circumstances. There is scarcely a field of labor where knowledge must be so definite, clear-cut, accurate and unequivocal, and where the element of personal familiarity counts for so much, as in the practice of pharmacy. We must not tell our student *about* the things of which we are teaching; we must make him personally familiar with them. It is not enough that we should explain to him the processes for doing his work. We must allow him first to see us performing it, and not at the distance of 150 feet, but so that he can see and understand every detail; and afterward we must have him do it under our supervision, and under conditions which admit of our following and sharply criticizing every detail of his manipulations. The old days when a sleepy attendance upon a course of lectures, however learned their source, could be considered a course of instruction, have gone, it is hoped never to return. The ideal is attained only when every detail taught in the lecture-room is followed by ample laboratory practice. Better, if anything is curtailed, that it be the didactic lecture rather than the laboratory course.

Coming now particularly to my own department, I note that the ultimate object of the study of pharmacognosy is to enable the student to identify and determine the quality of drugs by their physical examination. Perfection is reached when he is competent to do this in the case of every known drug. But such perfection is far beyond the bounds of possibility in the college course. Only a portion of the materia medica can be thus learned, and he must depend, in his dealings with the others, upon applying the descriptions, to which he will refer when necessary. He must, moreover, be prepared to intelligently interpret the descriptions of subsequent new-comers, and very likely to construct and present such descriptions of his own. Appreciating this necessity, we note that only half our task is performed when we have familiarized our students with such drugs as we can find time to study with them. We must supplement this teaching by making them perfectly familiar with the use of the terms used in scientific description.

We may therefore consider the following three tests as fairly indicating our success in securing practical results (the only kind that we have a right to consider) from our teaching:

(*a*) The ability of our student to form a correct idea of a drug that he has never seen, from considering a description of it.

(*b*) His ability to describe a drug fully and accurately in scientific language.

(*c*) His ability to recognize, and determine the value of a reasonable number of drugs from their physical examination.

If we keep these three practical results clearly in sight, we are in the way to know exactly what kind of instruction to impart, and we shall have a perfect guide to proportioning it.

To familiarize our students with the use of descriptive scientific terms and to thus meet the first and second of our tests, the course in botany and junior pharmacognosy is instituted. While the laboratory hour is known as junior pharmacognosy, it is really but the practical application of the teaching of the botany lectures. It is practical structural botany. Its superiority to the ordinary practical summer course in botany lies in the fact that we are not dependent upon the specimens that the season and locality afford, but we select from every locality, and preserve at leisure, during the summer, our material, and arrange it to suit our course of instruction, instead of being obliged to adapt our instruction to our available material. In addition there is the important fact that we work with dried materials, the same that the pharmacist must be capable of handling in his business operations. Thus, acquiring at the outset the more difficult art, the student later can pass with facility to that which is less difficult. The laboratory course should cover every point of structure presented in the lectures. But an hour's lecture will treat of more points than can be covered by an hour's work in the laboratory. I, therefore, have recourse to auxiliary illustration in the lecture room. We must all have experienced the difference between becoming familiar with an object itself and seeing it illustrated, by even the best possible pictures of the text-book and the chart. By the system of card-mounted specimens here shown you, perhaps half the technical terms of descriptive botany can be vividly illustrated in the lecture room. Each student holds in his hands one or more cards of specimens illustrating the lecture of the hour, and the didactic lecture becomes merely an explanation of the objects there seen, and the application to them of the proper descriptive terms.

The objection that will naturally be urged against this method is the enormous labor that it involves, and this objectionable feature can be neither disguised nor mitigated. To carry out the method with reasonable thoroughness for a class of 200 students, requires 50,000 mounted articles, besides all the material used in dissection in the laboratory. But, ladies and gentlemen, it pays the students; and the man who has assumed the responsibility of training a large college class cannot justly decline any labor that will be of such great advantage to them. As conscientious teachers we must consider that we are bound to our students by moral obligations far transcending the business obligations that bind us to the institutions by which we are employed. We must confront ourselves with the test that we accepted at the beginning. We succeed when we secure graduates in whom the accurate idea is excited upon the instant that a descriptive term is named. It is a cardinal principle in teaching that no term should ever be used until after the idea which it represents has thus become the property of the student. If, as I read the botanical description of a certain species of plant which he has never seen, a picture is gradually builded up in the imagination of my listening student, perfect in detail, in proportion as the description is thus perfect, then I count that my teaching of this student has been successful in this particular direction. But just so far as I fall short of this result, just so far I have failed in my efforts. This statement would not apply to the students in all classes of schools. The minister, the journalist, or the author, like the unprofessional man of culture, could undoubtedly profit much by a series of didactic lectures unaccompanied by any practical instruction. His financial success does not depend upon the extent or accuracy with which he can apply such instruction in the examination of natural objects; but this is by no means true of the pharmacist. Culture and discipline are not the objects sought, and we have no right to content ourselves with a course of instruction which ends there. So far as our work is concerned, it is true that any course of lectures on botany or pharmacognosy, or any portion of such a course, that is not followed up by securing for the student a practical familiarity with its subject matter, may just as well be omitted as introduced, except for the mere name of its presence. The student who has listened, although again and again, to such teaching, without having been shown the things of which it treats, is no better off as a pharmacist than he would have been without it. He still encounters in scientific description a language that is essentially foreign to him, and is a stranger and an alien among the richest collections of literature and the most entertaining of scientific society.

If this portion of our work has been faithfully and successfully performed, then the student is ready to examine intelligently the objects which he is to study in his second year, and thus prepare himself for meeting the third of our tests.

The drugs with which he is to become familiar under our instruction, he must see, and the word "see" here means a great deal. We must show him and teach him how to find for himself all the marks, both gross and microscopical, upon which the desired determination depends. To meet the requirements of this case I devote one hour in the laboratory for each hour devoted to didactic lecturing upon materia medica. While the lecture is called materia medica and the laboratory course is called pharmacognosy, we must appreciate that the latter is merely the practice of the former in certain directions. Therefore to say that I elaborate this kind of instruction so far as possible is to present one direct answer to the question, "How shall we make our teaching more practical?" For this purpose the articles are arranged in the order of their similarity in appearance, the order practically which is given in Maisch's text-book. The gross characters are first considered, the dozen or so specimens for the day being compared as to points of similarity and difference, and afterward several of the most interesting are examined with the compound microscope. To each student is furnished an ample specimen of each article, and in case of most of them he is allowed to retain them permanently, and is encouraged to study them further at home. Although the time thus allowed is short, yet it is sufficient to get a fairly good knowledge of all the organic drugs of the Pharmacopœia, and the point which is of greater importance is that he is fitted for properly pursuing his studies in the future without assistance, and this is of much more value to him than any information which he may gain while at college.

MR. WHELPLEY.—This paper is one that interests us in every direction, especially in regard to general pharmaceutical education, and the teaching of materia medica. One point has been of especial interest to me, and that is in regard to the qualifications of teachers. To briefly summarize the paper, as I have it in my mind, after listening to it, the author considers three points; first, the shortness of the course in pharmaceutical colleges; second, the limited education of the student, which was not brought out quite as fully as some of the other points were. but nevertheless it has been considered. The third point is the possibility of poor teachers of pharmacy. In regard to teachers not specially qualified for teaching pharmacists, it has often occurred to me that some teachers of pharmacy in this country, and perhaps elsewhere, do not fully realize what is required of them in the way of practical teaching—that is, they do not familiarize themselves with pharmacy. Their interest is confined to their own special investigations; they do not read pharmaceutical journals; they do not meet pharmacists, attend pharmaceutical association meetings, nor bring themselves face to face with the druggist, so that when they are teaching the student they can teach him with the idea of the druggist of the future. A man may be a good chemist, a good botanist, a good pharmacognosist, and be able to teach these branches abstractly; but, as the author has pointed out, the main point is to teach students with the idea of their future life and work. In order to do that it seems to me that every teacher in a college of pharmacy should use all means possible, such as reading pharmaceutical journals, becoming personally acquainted with druggists, ascertaining how drug clerks work in stores, what they do, what they talk about, and especially in attending the meetings of pharmaceutical associations.

As far as quiz classes are concerned, they have interested me for a number of years; and, as you are aware, I had an extensive paper on that subject last year. It is certainly gratifying to notice the importance which Mr. Rusby attaches to this aid of instruction. The shortness of the course in pharmacy, as we have learned from other sources, and shall probably learn to a greater extent in the future, is being remedied by an extension of the college courses. The laboratory work in pharmacognosy does not meet with the opposition that is sometimes accorded to that in pharmacy proper, and if it is not too much of a digression, I would like to state that it is strange how pharmacists will oppose the teaching of students in pharmaceutical laboratories, where they are obliged to make the various preparations, under the pretext that their clerks will learn from the instructions in the store all that is necessary in that way. I give this from private conversations had with druggists who speak slightingly of pharmaceutical laboratories, thus showing they do not fully appreciate them. Fortunately they do not pretend to know so much about the work with the microscope and the laboratory for materia medica.

I was especially pleased with one qualification required of the student—"His ability to describe a drug fully and accurately in scientific language." It seems to me that that sentence contains a great deal, and something that every teacher should aim at. In connection with that it may be stated that no scientific term should be employed in describing by the student, until he has become familiar with the use of that term, and, of course, the remark made that many of the students come to the colleges unprepared for the lectures, shows what an immense amount of work is required in order to bring them to that point.

In reference to the text-books mentioned, the recommendation of the text-book on materia medica by Professor Maisch is one that all of us must concur in. It seems to me that we should also take pains, as individuals, as well as teachers, to get not only students of colleges of pharmacy but students in the drug stores—that is, drug clerks—to read such a book as that. It will enable them to get a better idea of materia medica than is gained from the old-fashioned way of taking a dispensatory, and running from one end to the other.

These are a few thoughts that came to my mind as the paper was being read. One question I would like to ask Mr. Rusby, to get his idea of the value of specimens mounted in this way over those exhibited by lantern slides. These, as we know, enable an entire class to examine the same specimen at one time, while they do not have the advantage of seeing things as plainly as by the specimens themselves. For instance, in examining the surface of a leaf, the surface will not be shown as well, but the students could inspect them at leisure, in the laboratory. At the same time, to use specimens in this manner, when passed around among a class of two hundred students, is expensive in the way of time for preparing them, and we know how it is—even those specimens passed around among us to-night come back somewhat the worse for wear, and when they are passed among students not accustomed to handling anything of the kind, they come back in even worse condition, so that it must be expensive so far as time and outfit is concerned.

Mr. Rusby.—My answer to that is, in my opinion, unequivocal. I believe that the use of such specimens is far better, for the reason that if the students are examining the mere picture, they are not examining a specimen at all, but examining an ideal; and if afterwards they go out and find specimens which do not agree exactly with the specimens they have seen, immediately doubt arises in their minds. We have to classify leaves according to certain types, though the leaves may vary in some material respects. The students get an artificial idea when they see a picture. By the plan I adopt, one student sees the card which his neighbor holds, and each student sees half a dozen leaves, not all agreeing with each other, but pertaining to this type, and he gets an idea of this type, and is guided in his judgment later as to where to place the type. The use of the lantern is unquestionably good, and we resort to it freely; but it seems to me that my plan has very great advantage over this device, or the use of pictures of any kind. As to the expensiveness of it, I have 200 of these cards distributed at the lecture. I find from 5 to 10 per cent. of the specimens require touching up when they are returned. There is a stock of several hundreds of these specimens kept, and the assistant looks after them immediately, and if any are broken repairs them at once, and in an hour the specimens for that lecture are replaced; if it is impossible to do that at the moment, it is done during the week. It is, of course, a task to do as I know—not to my joy or sorrow, but cost.

The following paper was read:

HOW MAY PHARMACEUTICAL EDUCATION BE MADE PRACTICAL AND ADAPTED TO THE PRACTICE AS WELL AS THE THEORY OF PHARMACY?

BY DR. W. SIMON.

So much has been said and written during the last few years about pharmaceutical education that the subject might appear to be exhausted, and if I now attempt to answer some of the queries submitted by the Committee on Pharmaceutical Education, I do so, not because I desire to bring my own personal views before this Association, but in order to have the question thoroughly discussed by all who have a knowledge of, or feel an interest in, this matter, in order to be contradicted, if I be wrong, or to arrive at some unanimous conclusions, and, if possible, action, if my views be correct.

Unfortunately it is true that there is yet in this vast country a comparatively large number of so-called druggists (both old and young), who believe themselves to be fully competent to act as pharmacists, when they have learned the routine work of the shop—that is, when they have familiarized themselves with the buying and selling of the various articles called for in the store, and with the filling of such simple prescriptions as the physicians of the neighborhood may prescribe.

Of this class of druggists I need not speak in connection with pharmaceutical education; they have none and ask for none; their number is diminishing annually, partly because the laws of many States forbid their existence, partly because the growing generation feels the necessity of having some kind of professional education in order to carry on the drug business successfully.

It is chiefly this latter motive and the State law, more than real love for science, which in nearly all cases stimulates the young pharmacist to seek professional education, and the question then is: What should this education be, and how is it to be obtained?

There can be no doubt that in some cases men have obtained a full and thorough knowledge of pharmacy or of other professions or sciences without ever having attended a college or university where the respective branches were taught, but these cases are exceptions, and become less frequent in the measure as the sciences expand and the requirements increase.

The whole civilized world recognizes the fact that education in any sphere of human knowledge, in any branch of art or science, is best obtained at the institutions which have been created for that purpose—*i. e.*, in the schools, colleges and universities.

The pharmaceutical schools are therefore obviously the places where that portion of the pharmaceutical training should be acquired, which cannot well be obtained at the great majority of drug stores, because several conditions are missing, viz.: an adviser as to what and how to study, the apparatus for experimenting, and a demonstrator, showing the use of them, the time for doing such work, and last, but not least, the stimulating influence of the association with those aiming at the same results.

These considerations, no doubt, led to the establishment of pharmaceutical schools, and the question is: How much have these colleges accomplished in the way of educating pharmacists in the past, and what should be done in the future to extend their usefulness?

The educational standard adopted by the various colleges since they were first established has been elevated gradually, the course of instruction has expanded, practical work in chemical and pharmaceutical laboratories has been added, the requirements for graduation have been raised, and thousands of graduates in pharmacy, scattered over the whole United States, bear testimony to the benefit which they derived from the education and training obtained at their respective alma mater.

Yet, in this rapidly advancing age, where discovery follows discovery, where the progress made in every direction of human activity is unprecedented, where the demands for a more thorough knowledge in any branch of art and science are louder than ever before, the pharmaceutical schools are also brought face to face with the question of how to keep pace with this general demand for more exact and more thorough education.

The colleges, I have no doubt, are willing enough to comply with this demand for higher education, if only the pharmaceutical profession itself, or rather the individual members of it would aid the colleges in their efforts.

I refer here to the fact that a large number of pharmacists are very indifferent in selecting their apprentices, and that a majority of them have an absolutely insufficient preliminary school or college education, as is only too apparent at the examinations now given by most colleges to the applicants for matriculation before entering the college.

It is bad enough that many of the apprentices in drug stores, during the first two or three years of their apprenticeship, have but very little time, if any, for reading and studying, but it is worse when their school education, as is too often the case, has not been previously sufficient to cause in them the feeling of want of mental food, when thus forcibly deprived of it.

It might be said that the colleges have no right to matriculate a young man who has an insufficient preliminary education, and to a number of applicants the college doors are actually closed, but even the average now admitted is not of a quality desirable for good, thorough scientific instruction.

A second point, which I always look upon as being of great disadvantage to the successful study at our pharmaceutical schools, is the too freuqent combining of duties in a store with those of the student during the lecture season. In many cases the drug clerk hurries to and fro between the store and the lecture-room, without finding time before the lecture to prepare himself for it, or after the lecture to review it in his mind.

If not during both courses (junior and senior), certainly during the second course, the student should give his full time to college work, in order to be able to spend several hours daily in the various laboratories, and have time besides, both for studying and recreation.

Students entering our colleges with a better foundation to build on, and giving the teachers more time to erect this scientific edifice, will make better pharmacists than those who graduate without these essential conditions.

How are these objects to be obtained?

Civilization has an equalizing effect. We eat to-day at the *table d'hôte* in Honolulu or in Valparaiso, about exactly the same as is served to us in Paris, London or New York; we find civilized people dressed all over the world in the same kind of garments; we find scientists engaged in the same fields of research at the most distant points; we find that our tastes regarding art, literature and science become more alike; that our institutions of learning, the universities, colleges and schools are modeled more and more according to the same principles.

The dental colleges of the United States formed an association years ago, and adopted rules by which their mode of teaching and the requirements for graduation are governed. The medical colleges, at the last meeting of the American Medical Association at Nashville, took a similar step. At the same time efforts are being made to bring medical education in this country to the standard adopted by the European schools.

And this is what we have to do, and what we ought to have done long ago.

We first have to equalize the standard of our college education among ourselves, and have then to at least equalize it with the best furnished anywhere in the world.

The American Pharmacy Association is the representative body of the intelligent druggists of the United States. It is for this body to say what pharmaceutical education shall consist of, what standard of examination should be adopted.

I am well aware that an attempt was made some years ago to cause the teaching colleges of pharmacy to adopt a general plan for their curriculum and for their requirements of graduation. This attempt failed, but I most earnestly hope that a plan may be formulated during our meeting which is to be the basis for the action of colleges in the future.

Let us commence this work with a good will, let our aims be high and our efforts strong, and good results will follow our action.

Baltimore, September 1890.

MR. PATCH.—I notice the statement in the paper read that the dental colleges have adopted some uniform method or plan of teaching, and that medical colleges have taken steps towards the same end. I would inquire how a basis was arrived at. How could an old college like Harvard or Dartmouth, or any of the colleges in our large cities, harmonize with younger and smaller institutions? And how is it possible for a new college, which starts with a small equipment, both of apparatus and other facilities, to establish the same basis and method of teaching, except in a very general way, as one that has been established for years, and has that which the other has yet to get? It seems to me to be an impracticable idea for us to say that each college shall insist upon a certain kind and a certain amount of instruction. It would be like the efforts of labor to determine the remuneration which laborers shall receive in all the different departments—the holding back of the one to meet the condition of the other—perhaps a certain forbiddance to progress or advancement. It seems to me that these matters should be regulated by the circumstances and the times. I do not think there are many professors in colleges of pharmacy in this country instructing students in materia medica and botany—and I say this in a general way—who would feel like preparing fifty thousand specimens, as described by Dr. Rusby, although we concede its value. I believe that in the course of time our instruction will continue to become more valuable. Some twelve years ago in order to ascertain to what extent students desire practical instruction, I prepared a few books of materia medica specimens, with the synonyms, titles and principal constituents; but with a limited result. The students would not go to that expense. And yet we all admit—and I see gentlemen here from Boards of Pharmacy who have had experience with graduates in their efforts to recognize specimens of materia medica who will bear me out—that the true instruction in this department would require that every student should carry with him a specimen of every drug mentioned in the Pharmacopœia. He should be forced to do this, and obliged to pay for it, as he is forced to pay for his instruction in the various branches of pharmacy. I cannot see any way to reach uniformity as to the preliminary education; that must be accomplished by the methods of the college where the clientage will permit of a selection from it. We have changed our method of admission so that it doesn't matter whether one comes from a high-school or college he must pass a uniform examination for admission. We have ceased to recognize the diplomas of any school, taking the same view in relation to diplomas touched upon by some members since I have been here, as to their being recognized by Boards of Pharmacy, so that a man who has been working in any direction would have no objection to having his knowledge put to a test; for if by any means he has lost ground, it is to his advantage to learn that, in order to gain that which he has lost.

MR. SIMON.—As to how the medical colleges of the United States are now attempting to effectuate these matters, I will say, as it may not be known to you, that the dental colleges have actually accomplished this for the last three years or more. They recognize no teaching below a minimum standard. If a college desires to give more, it is of course at liberty to do so. The medical colleges have taken the same step at the last meeting in Nashville. They will no longer recognize as a reputable medical college any school, new or old, which does not come up to the minimum of the requirements, and I think that the pharmaceutical colleges might do the same. I do not think that the pharmacists of the United States can be forced to recognize a new institution, incapable of giving this minimum of instruction as being a recognized college of pharmacy until it has grown sufficiently in strength to give this education.

MR. REMINGTON.—I was very much interested in both the papers of Dr. Rusby and Dr. Simon. I would like to make a few remarks in regard to the last clause in Dr. Simon's paper, which refers to the feasibility of the colleges represented here in the American Pharmaceutical Association adopting some uniform plan for the curriculum. Professor Patch has already spoken on the subject, as to one phase of it. I believe that the old convention of teaching colleges, which used to meet during the annual meetings of the American Pharmaceutical Association failed of its purpose not because the delegates were not in accord individually in many ways, nor because there was a want of harmony, for I have generally found that wherever intelligent men are interested in a subject, the fellow feeling makes them wondrous kind, and bringing them together generally made them fast friends. I believe that the convention of teaching colleges failed of its purpose, because the delegates could not in any way bind the colleges they represented to their own view; and as Prof. Patch says, those colleges, situated as they are in various parts of the country, some in the old well-settled States and others in the newly settled districts of the West have to deal with totally different conditions. They have different kinds of students; some have large classes and great facilities; a young college cannot have those facilities. On the other hand, the young college has the advantage of having earnest professors, who having a smaller number of students, are able to give them individually greater attention than the larger colleges; so there are compensating advantages in that respect. But as for establishing a uniform curriculum, however desirable that may appear to us, when we assemble in convention, and however well we may see the advantages of it, when we lay these ideas at home before the colleges we represent, it is then seen to be impossible to devise a plan which would develop any uniformity of value, unless it may be on some minor matters which are not essential. I was very much interested in Prof. Rusby's specimens, and I admire the industry and the courage of a man who can get out such a collection as this; but I would like to ask Dr. Rusby whether it is possible to thus give a fair idea on—say the formation of leaves or inflorescence in a practical way? Can he get a sufficient number of specimens that will be illustrative, say of inflorescence, upon a single card or two cards like this to be of as much value as a diagram or a chart which would embrace probably two or three hundred sorts of specimens. I know very well that the actual specimen is far better, but does it cover every part of the subject of pharmacognosy, and does he not supplement this with some other method of teaching?

MR. RUSBY.—I think, and indeed I know, that the figures given are entirely erroneous as applied to the inflorescence; we have all forms represented. There are some mixed inflorescences, of course, that one encounters—some rare ones that are not there, but the principal ones are represented. As to diagrams I should use all the diagrams that are used in any college, but I would, as far as possible, supplement that by having the actual specimens before the students. Resort to any method by which you can give the student a full and accurate knowledge of the subject that is being taught; but of all the points of structure, the majority can be represented upon the cards. Those that cannot be thus represented, because they are not seen with the naked eye, can be shown in the laboratory in the time when we resort to the simple and compound microscope.

MR. EBERT.—I wish to say something from the standpoint of a druggist, and not as a teacher. We have constantly listened in the American Pharmaceutical Association, when discussions devoted to education were in progress, to arguments as to the necessity of preliminary education. I have not yet fully understood, and do not fully understand now, and I am very glad that I am in the company of so many learned professors of colleges of pharmacy, so that I may be informed what the preliminary education means. Does it mean the education that young men who attend colleges of pharmacy have derived from school learning, or a practical training in the drug store, which they should have had before attending college? Now, I say as an ordinary druggist and not as a teacher, there is where you have been making a great hubbub and mistake. If you concede what Professor Simon has stated to-night, that the student should not attend to the duties of the drug store in the second course, I would go one step further, and say that he shall not attend to the duties of any drug store in either course, but that he shall prior to entering the college have had either two, three or four years practical experience as a druggist before he be allowed to come into the college; then teach him the theory, and let such instruction as you give him be practical. First let him learn the duties of the ordinary toiler in the drug store; let him be familiar with the operation of doing everything that is necessary to successfully carry on the drug business; and after you have made him a full-fledged pharmacist, give him a diploma. That is what I call preliminary education. Your colleges of pharmacy may prescribe at the same time that he shall have a knowledge of the English language and how much he shall know of mathematics and of the dead languages; but as a former member of a board of examiners, on which I served for five years, I can say that some of your college graduates when they were examined were among the very poorest element that came before us. Theoretical questions they were able to answer, such as relating to chemical formulas or similar questions in chemistry; but when it came to practical questions applying to some of the duties in the drug store, they seemed to be more or less deficient. Now, you want to educate men so that when they leave you they will be a credit to you, and when they go behind the counter in the ordinary drug stores of this country, they shall impress the proprietor, who engages and pays them, with the belief that they have a practical as well as a theoretical knowledge of the drug business. If you will establish preliminary education, say to the young men: "Before you can matriculate in our college, you must have had three or four years' experience; then we will take you into our educational institution, and give you the necessary education." Make them good, practical druggists, who will afterwards follow the life of the pharmacist, a credit to yourself and myself, and be successful in business.

MR. STEVENS.—I think you know my views on the subject that has been touched upon to-night. I want to ask a question for my own information. At these meetings I have heard references made to the poor graduate and the poor examinations passed before the boards by graduates. As I understand it, all the schools in the country, except one or two, require what Mr. Ebert is trying to get you to introduce—two years of practical experience. They say four years; we will call it two, as that was the time named by Mr. Ebert. If this is the case why are the graduates so poor? I have heard it said repeatedly that they do not know paregoric from laudanum, and yet I know in one or two of these schools, where the four years' experience is not required, they have to examine these preparations, and know them by their odor, etc. It is a wonder to me why these graduates, that have three or four years' experience, are so poor as represented.

MR. SHEPPARD.—I wish to say, having been a member of a Board of Pharmacy for some time, that my experience was different from Mr. Ebert's. We do not find the college graduates, having this experience, so deficient.

MR. PATCH.—It seems to me that the colleges of pharmacy have not been put in the right light by Mr. Ebert. They are not designed to teach young men their business careers as salesmen, etc., but to furnish systematic training in practical manipulation, in practical identification, and in the correct theory, so that in all emergencies they may act intelligently. As to preliminary training that has been referred to, we understand simply a knowledge such as shall be gained in the ordinary schools of our land, in mathematics, history, geography and the like, for we all admit that the man who has a sufficient amount of such preliminary training is better adapted to comprehend the instruction he will get in the college. As to his preliminary experience in a store, that is something we can say nothing about intelligently, for every fair-minded man will admit that three months' experience in one store is worth more than ten years in another. These men who are graduates of schools of pharmacy that Mr. Ebert found lacking practical knowledge, like enough have had their experience in such a store. But if a man has had four years, experience in any practical retail drug store, and is not able to pass a fair examination of the State Board, as I have seen them, it is the fault of the man, and not his instruction in the College of Pharmacy. I will not admit that it is always most wise or best that the drug clerk should have this instruction in a store before he comes to the college. I think a great deal of the testimony of that musician who had two students come to him for instruction, one who knew nothing of music, whom he charged quarter the price that he did one who had had training with other masters; for the latter had so much to unlearn. So I think inexperienced men who come looking for knowledge make more headway than men with experience who think they know it all, and it takes them two or three years to come down to the teachable spirit. Extreme cases do not formulate rules, but illustrate them, and I can cite two examples, though there are members in this room who may think I am telling tales out of school. A young man had the practical experience in a college of pharmacy. During his summer vacation, of four months, he spent his time behind the counter of a drug store. He afterwards had an examination in the making of emulsions, pills, etc., with men who had ten years' experience in stores, and stood third in rank in a class of more than thirty. He went before the State Board of Pharmacy, and passed such an examination that though the members present admitted that they ought not to give a certificate in view of his small experience, yet he had com plied with the State law, and they could not withold his certificate.

MR. HALLBERG.—Mr. Patch has referred to a great master in music. I would like to refer to a great master in science on this question, for example, Herbert Spencer. If there is anything that will lead us to a correct conclusion in the solution of this problem, it is certainly a philosophical discussion of the subject—that is, a discussion which will lead us directly into such facts as can be disclosed from a scientific consideration and logical deduction. I'll not go any further on that line. (Laughter and applause). What I intended to say was that we must not single out instances, like Mr. Ebert and Mr. Patch have done. We must simply look into the matter and consider it in all directions, and then possibly determine upon which is right. There is no doubt whatever that until a man sees the necessity for the application of certain knowledge he is not placed in a position to avail himself of the greatest advantages of instruction in a college. I take it that a young man who goes directly to a college of pharmacy, without any, or with very little experience in a drug store, goes there absolutely ignorant as to certain practical features that will confront him in the lecture room and in the laboratory. The subject will be an enigma to him, and will be grasped only with difficulty, while on the other hand, if he has been in a drug store, though this may be poorly equipped and the proprietor may be wanting in knowledge, he nevertheless has examined at least some drugs, has become familiar with the nomenclature, and knows the difference between fluid extract and tincture, and solid extract, and other preparations; on going to a college, he will listen to the lecture, and work in the laboratory, recognizing the fact that there is a vast amount of knowledge to be gained not obtainable in the store. He is placed in a position at once to get the greatest possible benefit out of that instruction, and he will do all in his power to get it. In order to circumvent this practical need that a young man feels, and supply it, every college would have to build up a most elaborate and comprehensive system. These cards that Mr. Rusby describes are simply an offset against the practical instruction or knowledge which the young man should obtain in the store, and which he did obtain when our forefathers kept the store. I do not say it is practicable or possible at this time to obtain this knowledge in the store; but it shows the extent to which the colleges have to go in order to supply that which in a large measure the store did furnish. I do not think the standpoint taken by Mr. Ebert is exactly right. If a young man has been one or two years, or even six months in a good store, and is a proper age and of fair education, I think he ought to be entitled to take the first course in a college; but under no circumstances should a young man enter a college without first having been in a drug store. He should first have an opportunity to see whether the business is the kind he would like to follow as a calling, instead of first spending his time and money in acquiring an education for a business calling which subsequently he may find to be neither so pleasant nor so scientific as he thought it was; in such a case he would like to get out of it, but it is too late.

Mr. Whitney.—I was about to say that if Mr. Ebert had changed his word graduate to student, I would understand the difficulty that he refers to. A story told by Professor Patch on my journey here would satisfy many as to the difficulty we experience. Many people who claim to be graduates are merely students. Professor Patch told me a story on the way down about six or eight who came to him to be crammed. I will let him repeat the story.

Mr. Patch.—The statement I made is this. I have taken some pains to watch our young men who go from the college as far as possible, to see what progress they make. During one term I felt confident that six young men had come to our school simply to cram themselves; that is, they took that course of instruction which they thought would enable them, not to get a degree or obtain knowledge, but simply to pass the State Board examination. Those young men failed to pass in practical work, and were not successful in theoretical work. One barely passed, one had a fair record, and four failed altogether. I have only the interest in the State Board that any pharmacist has, and I maintain that our Board had as fair an axamination as any Board has.

Mr. Stevens.—There is but one point I wish to touch upon. I understand the feeling of many here, and do not wish, when I speak of drug stores, to have you think of yourselves individually, and of your own stores, but to travel, figuratively speaking, through this country from here to the Pacific coast, and go into a few stores on the way. Do not pick out the best pharmacists in each town, but call on all alike, and look at their prescription departments, the proprietors' methods of managing them, also the apparatus and material they use, and then consider whether you want a clerk who has been in their employ, who has been taught to manufacture those preparations, and put up goods on their counters, with dirt and filth lying around, as I have seen on my way to the Pacific coast. A year ago I made a point to see the stores in the cities I visited, and some of them were abominable. But I went into one in San Francisco, and the proprietor went with me from the cellar to the garret, and every corner was as neat and clean as could be. A clerk coming from such a store I would have confidence in. If you can, in any way under the light of heaven, make these applicants for a course in pharmacy take a course in such a store, then I will agree with you. Until you do so, I never can agree. You cannot control it. You say two years' experience. What does that mean? A man can go into a store and wash bottles and do similar work, and yet when he comes to your college he has had two years' experience, and you are obliged to take him in. I have a case in mind of a young man who is a graduate of a school of pharmacy. The experience he had was in a certain laboratory, and what had he been doing? Simply one kind of work. You know the majority of such men are under the control of a certain department, and that is all the information they get. What are you to do? They go into a store where the materials are given them to percolate, and what condition are they in? Not in the powders ordered by the Pharmacopœia, but put up by some house, and they do not know how to work a percolator in a practical way. If you take them then, and in your course of instruction show them how to make a pill mass, what material you put in, and why you put it there, and then take them to the laboratory and show them how you work there, you will then have men that do the work right, and do not throw in things promiscuously.

Mr. Remington.—I shall be very sorry indeed for the time ever to come when the colleges of pharmacy will be independent of pharmacists throughout the country as assistants at least in the education of the young pharmacist. Now, pharmaceutical education started out in this country, I think, on a correct basis, and that is, to require every candidate for a diploma to have a certain amount of practical experience in the drug business, and I attribute to it the success with which pharmacy has been practised in this country. I believe that to-day pharmacy is in a higher condition in this country than in any other, and it is due to the fact that when a pharmacist gets a diploma from his college, he is ready to go into a store, because the theoretical and the practical have gone together. I believe a student is much better off who has had some practical experience in a drug store, where he can repeat the experiments during the day that he has seen and heard of during the lectures, so that he has the advantage of having both the theoretical and the practical instruction combined. Professor Parrish and a good many others that we know something about, in the past held strenuously to this view. I believe they are right, and it would be a bad day when the colleges throughout the country would say, "We will teach you all you want to know within the four walls of a college." I do not believe we can bring the college up to the point where we can be independent of the drug store.

Mr. Markoe.—I am very glad to hear Professor Remington speak in this way. I believe, after an experience of thirty-two years—my whole business life—in the retail drug business, that it is impossible to learn pharmacy in a practical, successful business way without learning it behind the counter. I am perfectly willing to concede by way of argument that there are plenty of soft snaps in pharmacy—men who get through the college of pharmacy and cannot pass successfully before the boards of pharmacy; but I maintain those cases are the exception and not the rule, and, furthermore this is an age of progress. Within the short span of my life I have seen pharmacy in my district advance enormously. The grades of goods that are dealt in are infinitely better. We have now large numbers of well-educated men, where there were but a handful of leaders when I went to Boston. We must not lose sight of the fact that the time is coming, and is not far distant, when the men who are now in pharmacy, because they were established in pharmacy before there was any restriction, will die out, and their places will be taken by better men, and it will be the beginning of better times. This will work out by and by, and I do not believe any good will ever be done by removing the drug business so-called from a drug store base. I believe that the college of pharmacy is only the advanced adjunct of the store, and that no man will thoroughly learn the business, as it ought to be learned, without being behind the counter. A course in the best pharmaceutical laboratories, where only a few prescriptions are put up for instruction, is not to be compared with the experience gained in putting up the miscellaneous prescriptions in the store, where the difficulties that may be encountered will be learned. Of course there are poor men in business, but there are more good ones and more good ones coming.

Mr. Sheppard.—I have been a druggist for a good many years, and connected with a college for a good many years, and also upon a board of pharmacy, and I can only state my position on the question in this way: that no young man in my employ ever goes to a college of pharmacy until he has been in the store at least one year.

MR. HELLER.—I am perhaps one of the youngest men in attendance here, and have listened with a good deal of interest to what has been said. I am a graduate of a college of pharmacy, and have had the fortune to be examined by the board of which Mr. Ebert has been a member, and have passed it successfully. I think that preliminary education should be such as to enable a student that attends the school of pharmacy to grasp the subjects taught. As to practical experience I would be under obligations to Mr. Hallberg if he would inform me what practical experience in the general drug store consists of. How many of the employers have confidence enough in the student, who has not had the college education, to permit him to do anything but wash bottles, as some of the speakers have said, polish show cases, or even to mop up the floor? I am not saying that that has been my experience. I would not claim that it is not profitable to have drug store experience; but, after eight or nine years' experience in a drug store, and as a graduate in pharmacy, I think I would have been far more benefited by having had the college education before I had any practical experience. I would have understood manipulations far better than I did. I consider that the time I spent in the drug stores before attending a school of pharmacy, was just that many years wasted.

MR. HALLBERG.—Mr. Eliel will reply to the question.

MR. ELIEL.—I desire to describe how we give our young men the practical experience about which Mr. Heller inquires. When a young man enters our employ, during the first four or six months we teach him how to wash bottles, to clean graduates, and perhaps mortars, from resinous matter, and the like. That is the practical experience to start in with. When he gets a little further along we allow him to make the various emulsions, gladly do so, and then pill masses, and the other laborious preparations such as are called for every day in our pharmacy. We do not say, "Here, do this," but we stand alongside of him, and tell him how to do it, and if he starts in wrong, correct him. We show him how to grind drugs and see to it that he grinds them properly. We request him to manage percolators, giving him the necessary instructions in that kind of work. Many of the young men who have left our establishment have attended colleges and passed successful examinations of the State Boards of Pharmacy. One young man's name was read in the meeting the day before yesterday, who left us a little over a year ago, and who is in business in Texas; he passed a successful examination, but I don't think he went to college at all. He was with us about a year and a half, and wanted to know what to do to get along. I advised him to go to a college, but he couldn't afford it, and my recollection is that he became a subscriber to the National Institute of Pharmacy, and is now, for all I know; but I know that he passed the examination of the State Board of Texas and is now in business. That is the way we give our young men practical education.

MR. GOOD.—I do not desire to take up any time on this subject, which I think has been very thoroughly discussed. I thought it might be expected of me that I should put myself on record on this subject. Some may desire to know what I think of it. In the few words that I will say I would state that I frequently have applications from students entering our junior classes, who have never had practical experience in the drug business. I am not pleased to have such applicants. I always tell them candidly that in my opinion they are beginning at the wrong end of the business. But we have no iron-clad rule which will keep them out of the junior class yet. We say most decidedly in our catalogues that we do not encourage students entering the college at all before they have had some practical experience. My experience with clerks in my store is not to send them to the college until they have had two or three years' experience. Therefore you can judge how I feel about this matter. At the same time some good things have been said on the other side. The point, however, is to make the best druggists and to educate them on all sides, to make as bright men as is possible out of the material that comes to hand. A very important feature, which the paper presented, has been dropped entirely, and it is too large to take up now, that is, preliminary education. Preliminary training is not preliminary education, but it is quite as important. A man never can make a first-class druggist who has not both. He must have preliminary education. He may eventually make a first-class druggist if he has not had preliminary training, and he will catch on some time; but he is at a disadvantage for many years if he begins at the wrong end.

Mr. Clark.—This subject seems to have attracted more attention than any other that has been before this Section, the number of members who have spoken on it showing that it is important. The papers read, as far as I can learn, merely touch upon one branch of the work, the educational, and it seems to have drifted into the other branch, the legislative. In speaking with a number of the professors of the leading colleges of this country they have admitted that the preliminary education that has been given to the students previous to their entry upon the course of study of a professional pharmacist has frequently been lamentably lacking, a number not having received a good common English education. When asked as to what remedy they would suggest, they say the existing circumstances under which colleges of pharmacy in this country exist prevent it, it cannot be done. If they refused a student who had hardly a common English education, he would immediately go to another college where he could be admitted. Under these conditions it would be unwise to throw away the opportunity of receiving the student to their college, or raising the standard to such a limit that not more than one half the applicants would be able to pass the examination. The only solution of the question would be—and it may be easily done—for the State Boards to demand a certain education from those students before they entered upon their apprenticeship. Fix a standard by law, and then the colleges would have no difficulty in getting a better class of students. It is very evident to all here that if the student has not a good English education he cannot intelligently follow the lectures given in a modern college of pharmacy. I do not think the colleges as now constituted can solve the question. It can be done by the various examining boards in the several States fixing that preliminary education, which is very important indeed. We cannot legislate, and nearly all the examples that have been given us this evening are in the extreme, either the smart genius or the dull brain. We must fix the standard so as to reach the medium class. We know some men are capable of learning in one year what others do in two or three; what some can learn in one year, would take others ten. We must protect the medium. The colleges, united with the examining boards through legislation, will in time consider what time the student should spend in an average store throughout the country. There are undoubtedly in this country a number of stores lamentably deficient, and the proprietor doesn't seem to care or be willing to give such instruction as a man who intends to pursue the occupation of pharmacy, to make it successful, should require as information that will be of advantage to him. Where those circumstances exist, I think the colleges of pharmacy should supply the deficiencies the student meets with in the drug stores. We know the large number of manufacturers who are pushing their goods—finished products—throughout the country. How can a young man in a store, where these are used exclusively, learn how to manufacture such preparations, and know when they are properly made, when he doesn't start at the foundation, and is not taught how to make them? If a young man should come from a store of that nature, the college should be the place to supply the deficiency of information not acquired in the store. They should work earnestly with the different boards, and find where the deficiencies are. You cannot expect that a student should get all the information in attending at a college of pharmacy to fit him to be a practical pharmacist. The college does not pretend to teach anything concerning the commercial department. I think now that the movement has been started it will result in much good. The various Boards have come together, and formed a basis for the interchange of ideas before they will permit students to come before them for examination.

MR. EBERT.—One of the gentlemen who spoke said that some of the stores he visited in this country were of such a character that he did not believe the education students received in those stores was of any use whatever; he also spoke about the making of pill masses, and the use of an inferior powder in percolation. Now that is what I consider very excellent things for the colleges of pharmacy to base their education on. Even if that boy used for percolation a very inferior powder, or didn't know how to percolate or make a pill mass, that is where the colleges of pharmacy afterwards demonstrate that he has not learned the proper way; there their superior ability and educational facilities come in to teach him that he has not learned the business properly, and they are prepared to teach him the performance of these operations properly. That is the point, that where the education in those stores has been deficient, a young man upon entering the college begins to understand this, and he improves upon it.

Two communications, one from Mr. Wharton of Nashville, and another from Professor Koenig of the Pittsburgh College of Pharmacy, were read, and on motion referred to the new committee of the Section.

The following paper was read in abstract, and referred for publication:

SYNOPSIS OF A COURSE IN MICROSCOPY FOR PHARMACISTS.

BY DR. H. M. WHELPLEY, F. R. M. S.

The following synopsis is intended as a guide for a course of home study, and not such work as can be followed in a College of Pharmacy, where students receive individual instruction, and have the benefit of object lessons. The nature of a paper for this organization must confine it to limits which will prevent my giving an introduction to the subject.

Unfortunately for the pharmaceutical profession, we have no works upon the subject of Microscopy which can be taken as text-books for home instruction. There is a rich supply of works on Microscopy as applied to medicine; several volumes have been written for the microscopist who works in Chemistry, and the number upon the use of the microscope in the study of Botany is not small; we even find works devoted to the application of Microscopy in Petrology, and I hope that it will be at no far distant day when the literature of Pharmacy is enriched by suitable works upon Microscopy for the use of the druggist.

In order to fully appreciate and take advantage of the Microscope as applied to Pharmacy, the druggist must be quite proficient in Botany and Pharmacognosy, in other words, he must have the advantage of home reading or a Pharmacy College training. At the present time all of the leading Colleges of Pharmacy in this country have departments devoted to instruction in microscopical work, but those who graduated a few years ago did not have the opportunity of such training. Many of those who graduate at present, overlook the value of Microscopy while they are students, and defer the study until they have left college and engaged in business.

Although the educated pharmacist has quite an advantage over his less fortunate brother when he takes up the study of Microscopy, the same as he has in the daily pursuits of his vocation, still the druggist whose opportunities for study have been very limited, can advantageously follow out a course of home study in Microscopy. The work with the microscope can be taken up in connection with Pharmacognosy, Chemistry and other studies which the home-educated pharmacist must pursue.

One of the branches of an elementary education which is usually overlooked in our Colleges of Pharmacy is Physics. I find that the average student has received but a very meagre training in this branch during his school days. An understanding of the general principles of physics is of value to every individual, and especially so to the pharmacist. In order to intelligently work with the microscope and comprehend the principles upon which it is constructed, a person must be familiar with at least that branch of physics known as Optics. Therefore I recommend that every person taking up a course of study in microscopy shall first familiarize himself with optics. The chapter upon this subject given in the works on microscopy is scarcely sufficient for the purpose ; it is much better to study some work devoted to the subject of physics. Chapter VII in Norton's Natural Philosophy is a very good course upon the subject. The chapter upon Optics in Steel's Fourteen Weeks in Physics is also of value.

After mastering the principles of Optics, it will be in place to take up the study of the microscope as an optical instrument. The student will soon learn that microscopes are divided into two great classes : Simple Microscope and Compound Microscope.

It is best for the home student to confine his first work to that which can be accomplished with the simple instrument. It is advisable to purchase Manipulations of the Microscope by Bausch, which is a fifty-cent book ; also a volume entitled, How to Work with the Microscope, by Phin ; a new edition has just been issued, and sells for one dollar and twenty five cents per copy. Simple microscopes are not very expensive, so that a druggist can afford to purchase a good one with three separate lenses ; they range in price from twenty-five cents to two dollars and fifty cents.

After purchasing the instrument and reading what is said upon the subject in the works just mentioned, the druggist is ready to commence practical operations. It is not advisable to begin by studying drugs and objects the structure of which is not familiar, but examine such things as the integument on the palm and back of the hand, the print of the newspaper, the web of cloth, and similar familiar objects. After the student has become familiar with the changed appearance of such objects when seen under the simple microscope, he can take up less familiar substances, such as seeds, leaves, roots, powders, crystals, etc. The hairs found upon many of the vegetable drugs are very interesting and instructive, as they serve as one means of identification of the substances. After considerable practice in this line of work, the student is ready to take up the alphabetical list of substances in the U. S. Pharmacopœia. A simple microscope will enable him to observe the microscopical character of a large number of this list. The hairs on nearly all of the leaves are characteristic. The warts, wrinkles, ridges, hairs, scales, scars, etc., on branches, barks, rhizomes, roots and other parts of plants, often serve as a means of identification. Those drugs which consist of whole or parts of flowers are also suitable for microscopical examinations. There are also some of the pharmaceutical preparations, such as mercurial ointment, mercury with chalk, etc., where the Pharmacopœia directs the use of a microscope in testing their value.

The student should not become too ambitious and anxious to handle the compound microscope before he is perfectly familiar with the use of the simple instrument.

There are other uses in a drug store for the simple microscope than the examination of drugs; I may mention its convenience in making out the number of a prescription given upon a soiled label, and numerous other opportunities will present themselves to the observing pharmacist.

When the pharmacist is ready to buy a compound microscope, it is advisable to purchase a good stand, if it can possibly be afforded. This will enable him to add accessaries in the future as time, inclination and financial condition may suggest or permit. The cheapest compound microscope which can be made of service in a drug store will cost about twenty-five dollars. The instrument known as the Library Microscope, manufactured by the Bausch & Lomb Optical Co., is supplied with one-fourth inch and one inch objectives, which give a magnifying power ranging from eighty to three hundred and seventy-five diameters; this microscope sells for twenty-five dollars, and is as cheap a one as I would advise any pharmacist to purchase. Fifty dollars will secure a very fair outfit, giving one-fifth and three-fourth inch objectives, which are the ones most generally used by the pharmacist. If the student can possibly afford it, it is better to invest about seventy dollars, and secure a good stand with one-fifth and three-fourth inch objectives. Such an instrument is sufficiently complete to admit of the use of almost any accessaries which a pharmacist will ever have occasion to use. As an example of a microscope for this price I will mention the Griffith Club Microscope, which is very convenient for the use of druggists. Unless a pharmacist feels inclined to be lavish in the investment, it is not necessary to purchase a microscope cost-ing more than from seventy-five to one hundred dollars. Of course the accessaries may amount to an equal sum, but it is not advisable to have too many of them, while learning to use the instrument.

When commencing work with the compound microscope, it is better to learn to manipulate the stand with eye piece and objectives before any accessaries are added. The books which were recommended for use in studying the simple microscope are still more serviceable and essential when it comes to manipulating the compound instrument. In addition it is advisable to read one or both of the microscopical journals published in this country: *The Microscope* of Trenton, N. J., and *The American Microscopical Journal* of Washington, D. C. The subscription price is one dollar per year, the same for each publication. The student will also naturally be interested in the departments devoted to microscopy in the various pharmaceutical journals.

In commencing work with the compound microscope, it is best to follow the same plan as suggested for the simple microscope, and first study familiar objects. Among these suitable for the compound microscope we have the various fibres, such as wool, silk, cotton, and linen: every microscopist should be able to identify each one of these fibres. Small seeds, hairs, and even the dust which collects in a room, are suitable for study. When it comes to the study of less familiar objects, we have those mentioned while referring to the simple microscope, and in addition to the list come various kinds of starch grains, powdered drugs, and other substances which require no section cutting in order to be examined.

It is not advisable to attempt the preparation of permanent mounts for the microscope until the student becomes quite familiar with the examination of objects. By this time another work will prove of service to the pharmacist, and that is The Practical Microscopist, by Davis, the price of which is two dollars and fifty cents. As an aid and guide in the study of powders, I call attention to articles by Hans Wilder, entitled "Microscopical Examination of Powders" (*American Journal of Pharmacy*, June '90, page 278, July, '90, page 332.) Another source of valuable information on the subject is Bulletin No. 13, issued by the Division of Chemistry of the Department of Agriculture of the government; parts I, II, III, IV, and V, are all of interest to pharmacists, but it is part II that treats of the examination of powders. The bulletin is entitled "Food and Food Adulteration," and can be obtained by addressing the Secretary of Agriculture. These publications by the Department of Agriculture are intended for the use of the citizens of this country, and I hope that the pharmacists will see that good use is made of them.

If the student can afford the expense of a polariscope (which costs from twelve to twenty dollars, and can be used with the seventy-five dollar outfit), it is advisable to purchase one when this stage in his study has been reached. The polariscope is especially serviceable in the examination of starch grains, crystals, and many other substances.

The student is now ready to take up the work of mounting specimens for examination and preservation. It is best to commence with the preparation of dry mounts, such as are made with the use of paper covers. Then come dry mounts with the use of cements. I consider a turn-table essential to the outfit of any one who prepares permanent mounts; it not only enables him to make more elegant preparations, but saves time and trouble. After learning to prepare dry mounts, the use of balsam, both hard and soft, is next in order. Those who have access to the Companion to the U. S. Pharmacopœia will find the chapter on the subject of Microscopy very instructive when they come to the use of balsam, glycerin jelly, or glycero-gum, and other mounting media which require similar technic. The use of balsam should be studied before passing on to mounts made in liquids. The preparation of mounts in liquids is more difficult than in the foregoing media. Glycerin, carbolic acid and creosote water, castor oil and other liquids used in mounting, all require about the same work, and can be studied together.

After gaining proficiency in mounting specimens, the student should take up the work of section-cutting. It is best to commence with free-hand work, such as cutting soft vegetable tissues imbedded in elder-pith. It is very convenient to be able to make such sections, and sometimes circumstances are such that it is necessary to make them free-hand with a razor, or not at all. If the student does not practice this before he commences the use of the Microtome, he will never learn the art. An ordinary potato is a very good substance to practice upon for free-hand section-cutting. The first work of the Microtome should be on such substances as rhizomes of ginger, calamus, podophyllum, etc., which can be imbedded in Paraffin or similar imbedding substances.

We next come to the section-cutting of hard vegetable tissues like Pareira Brava, which requires special soaking, but no imbedding. Cutting sections of fruit stones, coral, minerals, etc., are not in order. They require the use of a saw and grindstone.

The student is now ready for the more difficult task of sectioning animal tissues and spongy vegetable substances, which are best imbedded in celloidine. I find that it is better for the student to learn to make sections and carefully handle them, before he attempts to mount specimens which require sectioning.

An artistic talent is not the good fortune of every one who studies microscopy, but any one can learn to draw more or less correctly what he sees under the microscope. The practice teaches the student to closely observe what he sees. I advise the student to commence drawing at the first lesson.

The use of the microscope in urinary analysis is work suitable for the pharmacist, but requires special instructions from teachers or books.

It is the duty of every one who works with the microscope to start a cabinet of permanent mounts. Whenever the microscopist is mounting a substance, he should make several preparations, so that he can select the best one for his cabinet and exchange the less desirable ones with his brother microscopists. For use in examining drugs, it is well to have mounts of the true drugs and also of substitutions which are known to be used as adulterants.

Pharmacists who have not already done so, should study the illustrations of the microscopic appearance of drugs as given in Maisch's Organic Materia Medica and the Dispensatories, as well as other works on Pharmacognosy.

The pharmacist who has time and inclination will profit by work in photo-micrography. An article on this subject was presented to the Association last year by W. H. Krug and A. B. Stevens (A. P. A. Proceedings, '89, page 84).

Another duty which devolves upon the microscopist is to associate himself with local organizations. This can be done in every case where there are two or more pharmacists working with the microscope.

If space would permit, it would be interesting to dwell upon the large field for individual and original work which presents itself to the student who makes use of the microscope in Pharmacy. The pharmacist who accomplishes most with the microscope will be the one who sets apart a certain amount of time each day or week for the use of the instrument. There is an infatuation about the use of the microscope which sometimes leads the microscopist to devote more time to the subject at one sitting than can be afforded, so that the instrument must be set aside and neglected for some time to come. Therefore I advise every pharmacist who takes up the study of microscopy to lay out a schedule of work, and follow it as closely as circumstances will permit.

In conclusion, I must state that system and order are of as much value to the microscopist as any workman. It is best to have a table, closet or box for the accessaries and reagents, so that they may be kept together. The microscope is very conveniently kept under a bell-glass, so that it is always ready for use at a moment's notice.

The Chairman read the following address:

The subject of pharmaceutical legislation is one that the pharmacist rarely sees realized according to his wishes. He may suggest or devise laws and place them in the hands of legislators for enactment, but the enactment of the law is rarely effected in the method and on the plan which was devised. The law as proposed by the pharmacist in the *true* interest of the public is generally made the subject of political wrangling or partisan ends, and the law, if it succeeds in being enacted, is sadly at variance with the original draft. Each State or local pharmacy law has had this same experience, and the amendments made at times frequently make matters worse.

The object of a pharmacy law should be to protect the public against incompetent druggists, whether employers or employees, by placing such safeguards against the risks that might arise from ignorance or wanton negligence. It is in the likeness of a police regulation which protects the people from other injuries of body or health, and those who are placed at the administration of these laws should first and foremost place a desire to obey the laws under which they are appointed in the spirit of law itself. The peculiar legislative relations of the several States toward the Central Government of our land, makes this portion of legislative enactment fall solely within the province of the States, or where local laws are enacted for the particular locality which it is to serve. National legislation, in order to enforce or secure a uniform law, is not possible, and the attempt to secure this from the hands of the several legislative bodies that make up the aggregate Union is equally a delusion and a snare. The laws now enforced in thirty-four States and four cities are in effect the outgrowth of a resolution offered in 1868 before the American Pharmaceutical Association, and the report of the committee made at the next annual meeting in Chicago, in 1869. None of these laws are, to my mind, equal in merit to that first proposed, though some of the detail of this proposed pharmacy law might have been simplified advantageously. The result of further legislation has been in many instances to simplify it to an alarming extent, till in some it has become a misnomer, and it might better have been named an act to perpetuate incompetence among pharmacists. This topic we need not dwell on, but simply state that, as all laws of this kind should be enacted for *future* results, they should be so worded as to compel every Board to satisfy itself as to the competency of the candidate.

The question of interchange of certificates of Boards of Pharmacy is one of the most frequently agitated topics in this line at present. With regard to this topic the speaker would call attention to the wide discrepancies in the laws themselves as to their requirements, these laws being in some instances manipulations of legal wire-pullers for some selfish ends. When, for instance, any physician without any experience as a compounder of medicines is admitted without an examination as thorough as that extended to the pharmacist, it is as manifest an injustice to the latter as if the pharmacist were admitted to the practice of medicine without any previous experience or study. When a law is enacted that is weak in some of its most vital parts, that law would be the one most sought for to aid in securing the faint-hearted or weakly-prepared applicant in passing his examination, and so the Board which was the most lenient or ineffective in its law would do the examining not only for its own state, but for its neighbors. Interchange of pharmacy laws would promote their evasion by fraudulent methods. A certificate may be identified, but how can another Board identify its holder? The writer speaks from personal experience when he states that in his judgment such an idea carried into effect would do more to demoralize the education of pharmacy and destroy the value of the certificates of examination, than anything he is cognizant of in the line of pharmaceutical legislation. There are a number of queries to be placed before you for replies and discussions, and the further elucidation of information should come from the members assembled.

During the year passed there has been some action regarding legislation both National and State, on the subjects which affect druggists. In the national legislative body the proposed law, better known as No. 279, which contained much that was odious to pharmacists regarding the method of determining the purity of drugs, medicines and chemicals, was discussed, but the character of the proposed law quickly brought out such unfavorable criticism that its introducer was glad to withdraw it and replace it with another which was far more in accordance with an honest enactment. The bill to "improve the condition of the apothecary in the navy" has not been overlooked by your committee; but there seems no probability of securing any action by the present Congress. Several States have made ineffectual attemps to secure pharmacy laws—Arkansas, Tennessee, Indiana—while in the younger States of Oregon and Washington the organization of State Pharmaceutical Associations has been followed by their earnest work to frame pharmacy laws which will be presented for legislative action at the next session of their respective Legislatures. In Pennsylvania there has been rendered a decision which temporarily seems to assert the right of a physician to practice pharmacy without examination or any other qualification than that he is a physician. The changes in pharmacy laws, and some facts and figures drawn from the reports of Secretaries of State and local Boards of Pharmacy, are embodied in appended paragraphs.

The address was, on motion, referred to the committee having in charge the Chairman's address on Education, to report thereon to the Committee on Publication.*

Mr. Whitney read the following paper:

SUGGESTIONS AS TO THE MOST EQUABLE METHODS OF CONDUCTING AN EXAMINATION OF CANDIDATES AND THE RATING OF REPLIES, BOTH ORAL AND WRITTEN.

BY H. M. WHITNEY.

At the personal request of Prof. Bedford, I will give a brief reply to Query No. 4 on Pharmaceutical Legislation.

It appears to the writer utterly impossible to formulate an inflexible rule that shall be applicable to all sections of the country, to all Boards of Pharmacy, or to the varied pharmacy laws of the several localities. It would be extremely difficult to make a list of questions where answers should have a value from 0 to 10, for it frequently happens that an answer is so bad it should be rated minus 5 to 10. In these days of rapid "strides" and survival of the fittest "methods," men and conditions change, and the method of to-day in successful operation may not to-morrow be the natural solution. Every Board of Pharmacy is supposed to have a method in conducting examinations and rating replies. To criticize that method without a knowledge of the law, the conditions and environments, would be unjust, foolish and in bad taste. Every member of this Association recognizes the fact that a competent assistant in one locality may be utterly worthless in another; that a good knowledge of chemistry and botany does not always make a good pharmacist. A familiarity and accurate determination of drugs and antidotes for all poisons, while very important, is far from what any of us would require of a person we proposed to have in charge of our business. What is required and what it is assumed every Board of Pharmacy expects to find before granting a certificate may be briefly summarized as a general knowledge of drugs, animal, vegetable and mineral, sources, appearances or general characteristics, compounding and dispensing, incompatibles, chemical and mechanical, solubility, explosives, corrosives, specific gravity, percentage, and ability to interpret hieroglyphics, abbreviations, sec. art., ad lib., etc.

Now, how can this be done equably, and how can it be rated? By giving experience and method of one Board all can approve and adopt, improve or discard entirely; the Board referred to works under a law which provides that the applicant, if found qualified, shall be registered as a pharmacist, and shall receive the certificate thereof. The Board consists of five members. They hold three regular meetings, as required by law, and call special meetings, as occasions demand—about twenty sessions during the year. The average number examined in one day is fourteen, and is thought to be a good day's work. A set of questions requiring an average of about one hundred answers is furnished by one of the Board for the written examination. The candidate attaches to his answers his application, in which he states, "the answers are evidences of my qualification," and this is kept on file for reference if required.

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* See foot-note on page 233.

There are thirty or more sets of questions now on hand, and about five new sets are added every year. No one knows the set of questions to be used until assembled for the work of the day. Ten crude drugs and ten liquids are numbered in boxes and bottles. Blanks are furnished and numbered; each candidate by himself writes against the number his decision, signs it, and attaches it to his written answers. The candidates are in a large room, with a monitor employed for the purpose, who watches for "ways that are dark" and forbidden, for quiz books, etc. The Board in an adjoining room calls in one candidate, and the oral examination begins by all members of the Board writing name, age, experience, and making notes as the examination progresses. Every member of the Board present has in his turn the opportunity of asking any and as many questions as he desires. The average time for each candidate is about twenty minutes. It sometimes happens that the first two asking questions take so wide and general a range that the others are satisfied, provided always that the written examination comes up to the standard. Attempts have been made to divide the oral examination into the several departments, as Botany, Chemistry, Materia Medica, etc., but in the opinion of the writer, that method is not as satisfactory.

After the oral examination, the papers are taken up, answers read by one of the Board and rated, also the rating of drugs. Each member of the Board now has his individual marking of the oral, written and the drug examinations. Each of the papers given out is marked from one up to the number examined for the day. The question is put by the Chairman, "What is your decision on No. 1?" A motion is made to pass a certificate or reject. If no objection, it is passed upon at once. If denied, a discussion, explanation and argument follow. If the vote is a tie, the Chairman decides, and the applicant is notified the following day.

In process of time, from the many and varied pharmacy laws and methods of examination, there may be precipitated a fairly uniform method, and an interchange of certificates brought about; but active and aggressive efforts to do it now would hazard, if not absolutely remove from some sections, all that is being done to-day.

Lawrence, Mass., August 22, 1890.

On motion of Mr. Sheppard, the Section proceeded to select officers for the ensuing year.

Mr. Remington nominated Mr. Wm. Simon as Chairman. Mr. Hallberg nominated Mr. F. C. Hogan as Secretary.

On motion, the nominations were closed, and the Secretary was instructed to cast the vote of the Section for the nominees presented.

The new officers were then installed, and responded briefly in acknowledging the honor of election.

Mr. Hallberg moved that a vote of thanks be tendered the retiring officers for the efficient manner in which they had conducted the business of the Section during the past year, which was seconded and carried unanimously.

The Section then adjourned.

A. B. STEVENS, *Secretary.*

REPORT

ON THE

PROGRESS OF PHARMACY.

FROM JULY 1, 1889, TO JUNE 30, 1890.

BY C. LEWIS DIEHL.

In conformity with the idea expressed, and in part carried out, in last year's report, the editorial comments of the American pharmaceutical journals have been abstracted for the present introductory to the Report on the Progress of Pharmacy, and will, it is thought, prove very interesting.

Among the subjects that have given rise to considerable editorial comment, the prospective Convention for the Revision of the United States Pharmacopœia (which has now been held), and subjects connected with the revision to be made, occupied a prominent place. Many of the subjects, it is true, are no longer subjects of controversy, having been acted upon definitely by the Convention. Nevertheless, it was thought sufficiently interesting to bring such comment here, if only to show how the voice of the pharmaceutical press has agreed on nearly all essential points, the slight shades of difference being readily obliterated and a harmonious whole secured. They tend, moreover, to show the influences that have been brought to bear upon the delegates to the Convention, and that the work of the new Committee of Revision will be materially lightened by the arguments that have been made upon the subjects entrusted to their discretion. This Association having been represented in the Convention, there will doubtless be a report from its delegation, and a nearer reference to its deliberations need therefore not be given here. The application of the editorial comments to the action of the Convention and to the final instructions to the Committee of Revision will become clear on consulting the delegate report.

Revision of the U. S. Pharmacopœia.—The "American Druggist" (Nov., 1889) draws attention to the differences of attention paid by pharmacists and by physicians to the approaching revision. While nearly every pharmaceutical society and journal in the country has given an expression of views regarding one or more of the questions involved, hardly a medical society or journal has given it passing notice; and one would infer from their apathy that physicians have no interest in standards of purity and strength for the articles which they are compelled daily to use.

It is remarkable that among the many articles on the subject of the next Revision, so few are of much practical importance. Matters of real importance—such as articles to be included, nomenclature, details of working formulas, percentage of active ingredients, methods for assuring uniformity and permanence of products—receive comparatively little attention.

In the forthcoming Revision the avoidance of sectional, professional, or personal bias in the preparation of the work, should be regarded as far as possible, and when it is completed, it should show, as little as possible, favoritism of the interests of any one of these classes.

The number of bodies entitled to send delegates is very considerably greater than ever before, and by the vote of the last convention there is now no obstacle to prevent ALL the incorporated medical societies in the country, eclectic, homœopathic and others, having representatives in the convention.

Recurring again to the apparent apathy of the medical profession in the matter of the Revision of the Pharmacopœia, and to the fact that the convention of 1890 will be more distinctly pharmaceutical than any which have preceded it, the "American Druggist" (Feb. 1890) observes that, while the field of the physician in connection with the revision of the Pharmacopœia is restricted mainly to deciding upon the admission or exclusion of articles—and this is a very limited field for usefulness as compared with questions of pharmaceutical manifestations, chemistry, and nomenclature, which naturally devolve upon pharmacists—these are good reasons why the presence of a reasonable portion of medical men upon the committee should be insisted upon. So long as physicians are expected to conform in any degree to the Pharmacopœia in their prescriptions, they must share in the responsibility, if not in the actual labor, of its revision and publication; and when they cease to be represented on the committee they will cease to be represented in the convention, or to regard the Pharmacopœia as a work in which they have any professional interest. When this time comes, doctors will have adopted, even more generally than now, the practice of designating the products of particular manufacturing pharmacists to be used in filling their prescriptions, and the condition of things which preceded the establishment of a Pharmacopœia will have returned in a great degree. The acceptance of the Pharmacopœia as an authority, and confidence in its preparations, depend in so large a measure upon the co-operation of the two professions, that every encouragement should be offered to physicians to participate in the work of revision.

Scope of the Pharmacopœia.—Speaking of the selection of articles which are to become officinal, the Editor observes that "the decision should be in favor of a greater rather than a lesser number. It may be safely asserted that in just so far as the Pharmacopœia fails to provide standards for nomenclature, composition and strength of articles which physicians prescribe at all, does it favor the development of proprietary articles and the prescribing of products of special manufacturers. So, too, the omission from the Pharmacopœia of articles which have been officinal, and have had a definite composition, permits their legal sale under a well-known title, but with variable composition. Indeed, the present need of both the pharmaceutical and the medical professions is rather in the direction of amplification than diminution of the list. The fact that an article is officinal does not render its frequent use obligatory, nor is it even essential that every pharmacist should have it in his stock." "An article once included, and standards for its composition and purity having been established, should remain. Corrections should be made of ingredients, processes, strength, etc., as called for by the experience and understanding of subsequent revisers; but having been of sufficient importance to justify its consideration at one time, there it should stay, so that future readers may at least know what it was when it was in demand. The ignoring of this need has helped the growth of the dispensatories and decreased the demand for the Pharmacopœia, until the latter has degenerated into a means for increasing the profits to be made out of the former."

"To further increase the usefulness of the Pharmacopœia, every title should, after the matter at present included, contain, in the form of subordinate notes, a description of the differences between this and the corresponding article in former editions and in other Pharmacopœias; the date of its original admission and such of its incompatibilities as are liable to produce toxic or harmful compounds, or such as are therapeutically inert." "But the question of dosage is not one of fact, and therefore should have no place in the book, any more than that of the price to be charged for each article."

Alternative Formulæ.—Among the propositions to effect a compromise between the advocates of the system of "parts by weight," and those who advocate the use of definite weights and measures, is one that contemplated the admission into the Pharmacopœia of *Alternative Formulæ.* The "American Druggist" (March 1890) points out, after examining a large series of such formulas that the proportions as established by the rounded-off figures, while in most cases not very materially deviating from the exact equivalents, yet are so different that two products—one made after the first formula, by actual weight and measure, and the other, by the rounded-off proportions, in parts by weight—will not be identical. It is, of course, well understood that, in the majority of cases—for instance, in tinctures, mixtures, syrups, etc.—this discrepancy would probably not be greater than that found in two products made by two different operators, by one and the same process, from materials which are unavoidably varying in their composition. In the judgment of the editor, it is impracticable to introduce alternative formulæ into our Pharmacopœia, except in a few cases where chemicals are directed to be produced which are capable of being assayed. And he has no doubt that those who have given any serious thought to this subject will arrive at the same conclusion.

Pharmacopœial Weights and Measures.—The "Amer. Journal of Pharmacy" (May 1890), calls attention to a circular issued by a Committee of the American Association for the Advancement of Science, and addressed to the professions of medicine and pharmacy, for the purpose of securing the more general adoption of the *Metric System of Weights and Measures* by physicians and pharmacists and the chemical and pharmaceutical manufacturers of our country. This admirably written plea for the adoption of the Metric System, among other strong points, makes the following:

"The merits of the Metric System have been so thoroughly recognized that it is adopted by most civilized nations. Further argument should be unnecessary to secure its universal adoption in our hemisphere, where it is already in exclusive use by all the States of Southern and Central America."

"It is a strange and irreconcilable fact, that the Governments of Great Britain and the United States, or the English-speaking peoples, should stand quite alone in their stubborn and persistent adherence to the use of heterogeneous standards of weights and measures, completely devoid of system in themselves, or of any practical and rational relationship to each other. And it is especially strange, in view of the practical utility of the Metric System, that the professions of medicine and pharmacy in this country should in this respect, at the present time, be behind the various arts of engineering, as must be conceded by those familiar with the facts."

"The educated representatives of medicine and pharmacy in this country favor, and would gladly adopt, the metric system; but find their efforts in this direction constantly hampered and nullified by the opposition of a large number of both professions who, through conservatism or lack of education, fail to unite in any concerted effort for its more general adoption and use.

"The Pharmacopœia does not now recognize the Troy system, and if the doses were taught in metric terms only, the old system would die out with the passing off of the present generation of practitioners. No inconvenience would be caused to any one, those who are too old to learn could go on using their present mode, and the new graduates would use that which they are taught."

It should be particularly remembered that we are not trying to introduce a new system, but to drop an old one, which is as irrational and unscientific as any other relic of barbarism. It is especially opportune at this time, when a new revision of the Pharmacopœia of the United States is impending, that the Committee of Revision, as well as the pharmacists, druggists and physicians of this country, should have their attention particularly directed to this important subject. For the use of these professions, six lines contain all that is necessary, as follows:

1,000 milligrams make one gram.
1,000 grms. or cubic centimeters make one kilo, or liter.
1,000 kilos make one ton.
65 milligrams make one grain.
15 ½ grains make one gram.
31 grams make one ounce Troy.

In writing prescriptions, a vertical line should be drawn between grams and milligrams, all figures on the left read grams, all on the right to three figures, respectively deci-, centi-, and milligrams.

Chemists think in milligrams and grams only, and pharmacists and physicians may do likewise, reducing our system to two denominations only. In the arts the milligram is not divided.

As the metric system is legal throughout the United States, any physician is entitled to present a metric prescription to the druggist. All boards of examiners in medicine and pharmacy, whether State or collegiate, are justified by law to exact, and should demand from every candidate for graduation or for a license a knowledge of the metric system."

The question of retaining or dismissing

Parts by Weight in pharmacopœial formulas has elicited a number of editorials, the drift of which is strongly in favor of its retention notwithstanding the opposition that has manifested itself to the innovation during the past decade. Thus, the "Pharm. Era" (Aug. 1889), speaking of the discussion on the report of the Committee of this Association on Revision of the U. S. P., "during which it was forcibly demonstrated that the majority of pharmacists are strongly opposed to the system of weights, or parts by weight, in the employment of liquids," expresses the opinion that parts by weight for liquid and solids alike is the easiest and most reliable system for all pharmaceutical work. It would be matter of regret to see a return to the old, unreliable and unsatisfactory methods of measuring liquids. The hope is expressed "that whatever be the system of weights and measures adopted by the Committee of Revision, it may be one superior, rather than inferior to that now in force."

The "Pharm. Record" (April 21, 1890,) also observes that recent inquiries made by the editor confirms him more than ever in his preference for the plan of "parts by weight," as producing more uniformity of product, and as being the better method. If weights are specified, the commercial or avoirdupois is inconvenient, from its being an indivisible sum, except by involving irregular fractions or introducing new divisions of a pound. If troy weights are specified we fear that few will procure larger weights in that system, and the calculations involved are far more likely to lead astray those who complain that this is a source of trouble in the present attempt to utilize "parts by weight." Bearing in mind all that has been made as adverse criticism against "parts by weight," we still adhere to the statement that it is the simplest and the best system now applicable to pharmaceutical use, insuring greater accuracy and uniformity than any other method. Finally—

The "Pharm. Rundschau" (May, 1890), referring to the statements in some of the pharmaceutical journals that the Pharmacopœia of 1880 has proved "a lamentable failure," and "a book incomprehensible to most pharmacists" on account of its adoption of parts by weight, as well as to the vote which the "Western Druggist" (July, 1888,) has obtained in favor of parts by weight (12 per cent.), and in favor of the metric system (14 per cent.), remarks: "It is almost incomprehensible that such statements really express the sense and the educational status of pharmacists, of whom more than twenty-five per cent. are graduates of pharmacy or medicine." "We trust, however, that at least the delegates who will assemble and constitute the convention for the seventh revision of the U. S. Pharmacopœia will be representatives of the educated classes of physicians and pharmacists, and will be adverse to any retrograde turn in regard to the system of *parts by weight* adopted in the Pharmacopœia of 1882, and in favor of *metric units* for measures of capacity, in case a return to measuring fluids, in place of weighing, should be preferred."

Dr. Squibb, in his paper, "The Revision of the U. S. Pharmacopœia" (Ephemeris, April, 1890,), makes some pertinent remarks on the same subjects. He says: "Objection having also been raised against the use of *parts by weight*, it is not unlikely that efforts will be made in the convention to return to arbitrary weights. *This*, again, *would be to lose all the ground gained by eight years' experience in this step of modern progress*. The chief reasons for adopting this simple and precise method of expressing relative quantities were: first, that it avoided the two tables of weights and measures, which had led to confusion for so many years, and allowed the operator to use any system which he might have at hand, including the metric system; and second, that it did not commit the Pharmacopœia to any definite quantity for its preparations, but allowed the operator to make the quantities that were best adapted to his wants at the time." Besides, it was a *step towards the metric system, the adoption of which, though distant, must now be considered very sure.*

The question of the

Standardization of Drugs and Preparations, like that of parts by weight, has been the subject of considerable editorial comment. The "Western Drugg." (1889) has this, among other things, to say respecting standardization. "Upon the eve of the next revision the question seemingly presents itself: are we sufficiently advanced in our knowledge of the active constituents of these drugs to warrant us in establishing and maintaining a standard which may defeat the very object in view? Of the drugs now standardized, the valuation of opium has during the past decade received more attention than any other subject, and not until the closing labor of Dr. Squibb in this connection can it be safely said that a satisfactory basis has been reached. In the case of cinchona no analysts reach exactly the same results, and the two foremost quinologists of the world, De Vrij and Hesse, are at this very time at loggerheads as to the constitution of quinine. The same may be said of nux vomica, every month showing errors in former methods of determining the alkaloids and their constitution. This result, it may be conceded, is in the very nature of things; perfection is attained by degrees only, if at all. But it must also be conceded that before attempting perfection in reality, we must have perfection in theory; that before we can fix within reasonable limits the percentage of active principles of a preparation like a tincture, we must have a clear conception of the constitution of these principles and thorough methods of their estimation. With this point yet to be reached with morphine and quinine, and even with strychnine, how much more remote is our knowledge concerning other active drugs, such as digitalis, ergot, or aconite, in which the 'taste' is considered more reliable than any 'test' so far discovered?"

The "Pharm. Era" (Dec. 1889) says: Pharmaceutical journals are just now vigorously discussing pro and con the advisability of the adoption of standardized preparations in the Pharmacopœia of 1890. The idea of having all medicaments of uniform standard strength, is eminently good and proper, and all wish they were so, but how to make them thus uniform is the question agitating us all at present. We are of the opinion that haste must be made very, very slowly, as ill-advised and precipitate action will defeat the very purpose aimed at. The prevailing sentiment of those who are expected to be the users of the Pharmacopœia is opposed to the incorporation of, and insistence upon, definite stringent methods of assay or standardization. It is objected that we are not sufficiently qualified to conduct satisfactory assays, and, moreover, that in a large proportion of instances it would be impossible to decide upon the best method to adopt. In the revision of 1880 were incorporated assay methods for opium and cinchona, which, though simple and plain to every understanding, we venture to state have never been conducted by at least ninety per cent. of the pharmacists of this country. The fact that these methods are faulty and inaccurate in several respects has no bearing upon the question at issue. The great majority of druggists do not feel, and cannot be made to take any interest in the matter, and cannot be forced to assay a preparation, and we submit that, for this one reason if for no other, the radical innovation of insisting upon standardized preparations would be decidedly premature."

"The Amer. Drugg.," (January, 1890), speaking of the effort made in certain quarters to introduce the standardization of drugs and preparations in general, into the forthcoming Pharmacopœia, says: "There is considerable pressure being brought to bear, even at this time, upon members of the medical and pharmaceutical professions, by the advocates of an extended series of standardized articles. It is, however, plain to the unbiassed observer that these efforts almost exclusively emanate from manufacturing houses, or from members of the medical profession who favor this plan on theoretical ground. It is safe to say that the vast majority of the pharmaceutical profession, including its best representatives, while willing to proceed steadily in the direction of assayed remedies, are not prepared to make the hazardous jump from unassayed to accurately standardized remedies at one bound."

"There will probably be not the least objection if the next committee should prescribe a process of assay for nux vomica, ignatia (if retained), belladonna, and a few other energetic *crud edrugs*. But most serious objection would be raised if *every crude* drug containing an active principle capable of being assayed were accompanied by such a process of assay, and possibly by directions as to how much of the active principle it should contain, or by directions requiring it to be taken in such proportions that the several preparations derived from it shall always contain an absolutely uniform percentage of active principle." "There is a serious objection against an official demand of standardizing many preparations." There is "no objection whatever to an assay when we can be sure not only of the *quantity* but also of the *identity* of the product. In assaying solution of soda we can readily do both. In assaying opium we are also able to do it. In assaying ipecac, colchicum, lobelia, etc., *provided we start from absolutely genuine drugs*, which we have inspected and handled ourselves, we can likewise do it; but the assay in these cases, unless executed upon a large quantity of the drug, merely enables us to estimate the *percentage* of active principle, which we usually *assume* to be that which is characteristic of its respective drug. We do not usually, and in most cases cannot, subject the product of the assay to any reactions of *identity*. Yet this is immaterial; since if we started from, say, a prime quality of ipecac, having every evidence of being genuine, we are fully justified in assuming the final precipitate to be or to contain the emetine which we know is the active principle. But supposing we had *purchased a ready made* fluid extract of some particular drug, and we were to subject a small portion, such as is usually taken for this purpose, to an assay, using some of the usual alkaloidal precipitants, for instance, potassio-mercuric iodide. Have we any sure proof that the fluid extract was originally made from that drug alone?" "We are glad some progressive firms put upon the market powdered drugs with statement of the assay, and we are perfectly willing to agree that the Pharmacopœia shall demand of certain crude drugs a definite percentage with addition of a process of assay. Most of us have to buy our crude drugs in the market, and we might just as well buy them assayed, or, if we can, assay them ourselves. And if we make our preparations *ourselves* from such assayed drugs, we will surely all obtain tolerably identical preparations, more accurate than those at present in vogue, but not of such pedantic accuracy that we cannot trust ourselves to make them. To go further at present, and to demand the introduction of a large number of *assayed preparations*, would be a grievous mistake as well as wrong."

In a second editorial the "American Druggist," (May, 1890), emphasizes its position on the subject of standardization still more strongly. While not opposed to standardization from principle, in fact, desiring to be on record in favor of definite standards, when these can be determined with reasonable certainty, and without complicated processes, it is believed that the establishment of definite standards, to be determined by so-called assays, would, *at the present time*, be premature, though it is not doubted it will become possible in the future. No positive or reliable conclusion can be based on an assay where the *nature* or *identity* of the substance remains unknown, or can be established only by tedious, elaborate and expensive processes. It will require a number of years of careful study to work out processes which will be reliable, free from tedious complication, and satisfying every requirement.

The "Druggists' Circular" (March 1890), speaking on the same subject, says: "That difficulties and uncertainties are to be met with in assaying vegetable products no one will pretend to deny. Chemists have not agreed on a process for ascertaining the strength of so important a drug as opium, and differences of opinion will multiply as the subjects for assay are increased. But because no one can prove to the satisfaction of all objectors that a given morphiometric process is perfect in its results shall we give up all attempt at assaying opium and use it as we find it, with a strength ranging from next to nothing up to 16 or 20 per cent.? We doubt if such a proposition would receive the support of any but the most prejudiced anti-assayist.

Now, if the first effort towards introducing standardized drugs has been of any service at all, why should not the movement be extended, at least in the direction of research as to methods by which satisfactory assay could be accomplished? The question turns entirely upon the usefulness of standardization. If medical men find advantage in uniformity and demand it, the pharmacist must do his best to secure it. The chief arguments against any endeavor to introduce standardized preparations into the Pharmacopœia seem to be inspired by a fear that the processes necessary to make them would be too difficult for the average pharmacist, and consequently the large manufacturer would have more opportunities to absorb business from the retailer. This sort of reasoning is simply puerile, and an insult to the pharmacal profession. The process of standardization includes nothing which cannot be brought within the comprehension of any one familiar with the simplest chemical manipulation; and suppose there should be difficulties which some pharmacists could not meet, how are they to prevent the manufacturer from occupying a field they will not undertake to enter. Doctors are easily enough persuaded to use preparations represented as the products of advanced science, and do not concern themselves at all whether such preparations are officinal or not. The pharmacist who would keep up in the race must manifestly do it by positive effort. If he feels incompetent to meet the demands which the advance of science is making on his skill, he must qualify himself further, or submit to be made more and more a mere seller of drugs.

The "Pharm. Record" (April 7, 1890) remarks that "the matter of standardization is already an accomplished fact, for the Pharmacopœia is a book of standards alike for producer, dispenser, and the physician. Besides the standard of proportions of crude drugs and chemicals that enter into the preparations themselves, the same guide-book has given certain standards for the chemical or extractive strength of crude drugs of finished products. To be sure it is not many that are thus standardized, and more is the pity that the directions are not heeded to a wider extent than they are; but there is no reason why there should not more be standardized now than there were authorized ten years ago." "Those who favor the addition of other articles to the few already standardized are not all looking to the private interests of the few, but rather at the broader interests of the consumer, the invalid, that there may be more certainty of results when an article is to be used for their relief. If powdered opium is sold at a standardized strength of morphine content, why may not other alkaloidal drugs be similarly standardized? If tincture of nux vomica be standardized why not some other potent tincture?" "We favor standardization of potent drugs whenever it can be readily and reliably done without entailing unnecessary expense or serious trouble to secure it, and oppose it when it is not desirable or fails to add security for uniform products."

The "Pharm. Rundschau" calls attention to the following list of drugs, the standardization of which, as well as of the galenical preparations made from them, should in the opinion of J. B. Nagelvoort be made obligatory in the new Pharmacopœia: *Tuber Aconiti*, *Radix et Folia Belladonnæ*, *Folia Cocæ*, *Semen Physostigmæ Venenosi*, *Cortex Cinchonæ*, *Fructus Conii*, *Semen et Tuber Colchici*, *Cantharides*, *Rhizoma Filicis Maris*, *Guarana*, *Radix Ipecacuanhæ*, *Semen Strychni*, *Opium*, *Podophyllum*, *Cortex Rad. Granati*, *Tuber Jalapæ*, *Folia Jaborandi*, *Cortex Quebracho*, *Semen et Folia Stramonii.* The "Phar. Rundschau" agrees with Mr. Nagelvoort that it is preferable, and to the general interest, to utilize the at present available methods of standardization applicable to the more important drugs in the Pharmacopœia, inasmuch as they serve the purpose at least of giving an approximate criterion of their strength and value, notwithstanding that they may not be absolutely accurate in some instances.

In this connection it is of interest to bring to notice some pertinent remarks of Dr. E. R. Squibb on the subject of "Assay Processes for the New Pharmacopœia," which remarks, in fact, have called forth Mr. Nagelvoort's suggestion. Dr. Squibb (*Ephemeris*, April, 1890,) says: "The assaying of crude drugs for their active principles seems an easy matter to those who only read and write upon the subject. But those who attempt to practice the processes soon get a very different impression, for there is really nothing more precarious and uncertain than those assays in general hands with but a small experience in such work. Assay processes might perhaps be directed for a few additional drugs such as *Aconitum*, *Belladonna*, *Conium*, *Hyoscyamus*, *Ipecacuanha*, *Jalapa*, *Nux Vomica*, *Scammonium* and *Veratrum Viride*."

"Pharmacopœial processes of assay will be successful or unsuccessful in proportion to their character. If they aim at a high degree of accuracy and precision they must necessarily be elaborate and complex to a degree *that places them beyond the reach of general pharmaceutical ability*. But if they aim at only the very moderate degree of accuracy, such as satisfies the careful manufacturer in the selection of materials, rough processes of approximate assay may be found that are sufficiently easy of application to be successfully applied to pharmaceutic ability and usage through the authority of the Pharmacopœia. While most of these rough and ready processes are secreted in the hands of manufacturers, yet enough of them are published to give the Pharmacopœia opportunities of selection in these, and in the trials for selection similar processes for all would be naturally reached."

"Another important consideration not to be overlooked, is that, with the exception of Cinchona, Jalap, Opium and Scammony, the drugs named can always be bought by pharmacopœial description and tests, of such quality as to yield preparations of practically uniform therapeutic value." "Out of some ninety officinal drugs in all, there are about thirty-four of the more important ones which may be fairly represented by *Ergot*, *Rhubarb*, *Butternut*, *Pareira*, *Cotton Root*, *Cimicifuga*, *Buckthorn*, *Leptandra*, *Senna*, *Wild Cherry*, *Dandelion*, *Calumba*, *Gentian*, *Sarsaparilla*, *Spigelia* and *Stillingia*, which could not be adjusted by any ordinary process of assay, and which do not need it if they could, because care in buying them by pharmacopœial description and tests, rather than price, will always secure a uniform good quality at moderate cost."

Price of the United States Pharmacopœia.—The "Pharmaceutical Era" (September, 1889), after communicating the expressions of opinion regarding the price of the United States Pharmacopœia given by representative pharmacists as well as members of the Committee of Revision, 1880, remarks that there were but two expressions adverse to a reduction in price. It is the opinion of the "Pharmaceutical Era," as it is of a large majority of its correspondents, that a reduction in the price of the work will popularize it, and that it will be found in the majority of drug stores, instead of as now in a minority, if a material reduction in price can be made. At the same time such reduction should not be made at the expense of thoroughness and reliability.

Improvements in the United States Pharmacopœia.—The correspondence in the "Pharmaceutical Era," relative to the price of the Pharmacopœia, has also brought out some suggestions relating to improvements in several directions. The most important changes deemed necessary are three, viz., the use of explanatory notes, the adoption of a more satisfactory system of weights and measures, and the statement of maximum dose of each article or preparation. Commenting on this the "Pharmaceutical Era" (Oct. 1889) expresses the belief that the addition of explanatory notes, similar to those that have rendered the "National Formulary" so popular would constitute a feature worthy of adoption.

Copyright of the Pharmacopœia.—The "Pharmaceutical Era" (March 1890), discusses the desirability or rather the propriety of copyrighting the United States Pharmacopœia, and arrives at conclusions which are substantially summed up in the following:

"Every one who wishes to use the text-book of the U. S. Pharmacopœia for quotations or scientific comment should be able to do so freely and without charge. But any book which so completely quotes the words or essence of the work *that a purchase of the latter itself becomes unnecessary*, should be subject to a royalty. If such an anomaly should happen that the author of such a book were to accept no money consideration from the publisher, and the latter were to sell it at cost, then the feature of commercial money-making would be eliminated, and we would say, "Don't exact any copyright in this case." But such a case, will not happen, this side of a millennium. Dispensatories are not mainly published as free contributions to human knowledge, but largely as commercial ventures, calculated to yield a large profit to publisher and authors, the latter of whom must, of course, be able men. It is not more than fair that at least a nominal bond of obligation should be established between the Pharmacopœia and works which are almost pure substitutes for it."

Pharmacopœia Convention of 1890.—The "Phar. Era" (June 1890) observes that the Pharmacopœia Convention of 1890 was successful in this, "that it brought forth a large representation of the physicians and pharmacists of the entire country, and secured the substantial agreement of all upon the essential features of the Revision. There was no dead-lock upon any important question. Nothing of any consequence was carried out against a large and insistent minority. On those questions which have caused somewhat bitter partisanship in some of the discussions of the pharmaceutical press, the final voice of the meeting was nearly or quite unanimous. The partisans were there, yes, and they rose to the occasion again and again, they lifted their voices in debate, they spoke for the whole country and for the year 1900, they moved to amend the motion and to amend the amendments, they spoke again and cheered each other to the echo; but when speech had been spent, then they voted. The sober sense of the body was measured by its ayes and noes, rather than listened to in the debates. The logic of the majority usually proved so persuasive that, as the house took action step by step upon the provisions of any measure, there was approach toward a united judgment, or at least a common consent respecting the leading principles of revision. And let it be observed that an agreement in the convention of '90 was so far representative of the whole country that whosoever shall say that it was all under the rule of a ring, or other words to this effect, will but make known his ignorance of pharmacopœial legislation."

New Austrian Pharmacopœia.—The "Pharm. Rundschau" (Aug. 1889) draws attention to the new Austrian Pharmacopœia which has just appeared under the title: *Pharmacopœa Austriaca Editio Septima.* This work, with the exception of the Ministerial Order respecting its introduction and application to all of the countries embraced by the Austrian Empire, is printed throughout in the Latin language, and went into effect January 1, 1890. It embraces 577 articles, a list of reagents, utensils and test-appliances, 12 tables, and a list of obsolete synonyms. Among new remedies that have been introduced are: Antifebrinum Antipyrinum; Cocainum; β–Naphtholum; Mentholum; Cort-Condurango; Rad. Hydratis; Tr. Strophanti and Lanolinum. The following articles required for surgical purposes must be kept in stock in every pharmacy: Catgut, calico bandages; carbolized silk; carbolic-, iodoform-, and hydrophile-gauze; Brun's cotton; gutta percha paper; Bilroth's battist, and carbolized draining tubes. The method of percolation is described as desirable for securing preparations of better quality, and a number of extracts and fluid extracts are directed to be made by the method.

Speaking of the appearance of the new Pharmacopœia for Austria, the "Amer. Jour. Pharm." (Nov. 1889) says also that a

New German Pharmacopœia will probably make its appearance during 1890. The commission appointed for the last-named country consists of thirty members, among whom are to be found some of the best-known German pharmacists and teachers of pharmacy: like Vulpius, Schacht, Brunnengraeber, Flückiger, Hilger, etc. The medical profession is likewise represented by well-known men. During the month of October the commission held a protracted meeting in the city of Berlin, and it was the intention to further the work to such an extent that merely the final editing should remain, which will be done under the supervision of the Health Office of the Empire.

New Dutch Pharmacopœia.—The "Pharm. Rundschau" (Dec. 1889) draws attention to the new Dutch Pharmacopœia which appeared in the beginning of November under the title: *Pharmacopœa Nederlandica, Editio 3*, in Latin, and at the same time under the title: *Nederlandische Pharmacopœa* in the Dutch language. It goes into effect on July 1, 1890, in place of the Pharmacopœia issued nearly twenty years ago (1871). The new Pharmacopœia contains 514 articles and twelve tables. The process of percolation is introduced, and directed for the preparation of some of the tinctures. Formulas are given for a number of surgical appliances, such as cotton, gauzes and mulls. Among new remedies, acetanilid, antipyrin, resorcin and naphthol have been admitted. Formulas for chemical preparations, with few exceptions, are omitted; but explicit tests of identity, purity, etc., are given, preference being given to volumetric methods. Methods for the determination of the strength of important drugs and of galenical preparations are also given. The fineness of powders is designated, as in the U. S. Pharmacopœia, by the number of sieve meshes. Quantities are all in parts by weight, and the proportions are conformed to the metric system. The sp. gr. is given for each tincture.

International Pharmacopœia.—The "Pharm. Rundschau" (Oct. 1889), referring to an article by Prof. Ed. Schaer upon the Value of an International Pharmacopœia and Uniformity in the Measures and Weights to be used in the Pharmacopœial formulas, agrees with Prof. Schaer that the project of forming an International Pharmacopœia is impracticable, and should be abandoned once for all. All that it can be practically hoped to accomplish is a certain uniformity of the Pharmacopœias of the larger countries; uniform titles for drugs, and preparations in common use; uniform weight and measures, and strength of potent remedies; and uniformity in the methods of preparing remedies, whose constitution, contents and potency are dependent in one respect or the other upon the method of preparation or source.

International Pharmaceutical Congress.—The "Amer. Jour. Phar." (Sept. 1889), calls attention to the fact that the Seventh International Pharmaceutical Congress has at last been definitely called to meet in Milan, Italy, early in September of this year. At the Sixth Congress it was decided to convene the Seventh in 1888, but, as was the case with several preceding Congresses, it was deemed inopportune to let it take place precisely at the time fixed, and though the precise cause has not been made public, the failure to meet in 1888 is thought to have been due to lack of time to get ready, while several other international meetings held during the Paris Exposition in 1889, prompted a further postponement until 1890. The Pharmaceutical Association of Lombardy has appointed a committee of organization, and circulars have been issued defining who shall be entitled to be admitted as members of the Congress, as follows:

(*a*) Professors of universities, polytechnic schools and colleges; (*b*) professors of physical and natural sciences of any school; (*c*) pharmacists and chemists delegated by pharmaceutical associations, or by sanitary authorities; (*d*) members of sanitary councils or boards; (*e*) assistants of institutions, laboratories or cabinets devoted to physical and natural sciences, medicine or pharmacy; (*f*) chemists, directors and assistants of municipal laboratories, agricultural stations, and of all laboratories for the public service; (*g*) proprietors and directors of chemical industries and chemists attached to such industries.

The "Phar. Rundschau" (Aug. 1889), calls attention to the remarkable perversion of the objects of the Seventh International Pharmaceutical Congress that becomes evident from the circular of the Committee of the Lombardy Pharmaceutical Association, in which the meeting of the Congress is called for 1890, and the qualifications of those entitled to participate in the Congress are designated. It appears from this that pharmacists, unless delegated from some well known or obscure association, cannot participate in the deliberations or vote in this Congress, while every presumptive *chemist*—no matter what his occupation—every *teacher* of an elementary or private school, every owner, director or chemist of a chemical establishment, and a host of others are entitled to all the privileges of participation in this Congress, upon application and payment of a certain fee.

The Status of Pharmacy.—The "Drug. Circ." (September, 1889), remarks that it has lately come into possession of an unusual quantity of literary material bearing more or less directly upon the pharmacists' proper status. None of the writers directly take up the question of whether pharmacy is a trade or a profession, but their opinions could be easily applied in such discussion. On this subject the editor makes the following observations: "Pharmacy, considered in itself, is certainly not a trade; neither is the selling of drugs a profession. The business of the pharmacists requires, for its successful prosecution, a commercial training, but the public have no concern with this. So far as they have intelligence they demand that when it comes to dispensing medicines the pharmacist shall be to them a professional man. It may be that through the more general appreciation of the value of regular education in pharmacy, the student is sometimes liable to overlook the need of a corresponding training in commercial affairs. If there be such a tendency it ought to be corrected. But it is impossible at this day to imagine that colleges, notwithstanding all the jibes they endure, (and perhaps in some cases justly), can occupy any other than the front rank in the work of providing the public with skilled and trustworthy pharmacists."

Pharmacists as Merchants.—The "Pharm. Record" (July 15, 1889), discusses the subject of pharmacy in its mercantile relations. "Pharmacists are usually required under existing conditions to carry on a miscellaneous druggist's business, which, in addition to pharmacy proper, covers many lines more or less nearly related, some of them, in fact, quite remotely, and in this aspect the business of the pharmacist is merged in that of a merchant, and instead of being in a position to follow his chosen scholarly calling he is compelled by the pressure of circumstances to meet the rush and competition of common trade, and his special sphere is greatly curtailed. In this state of things there is some danger that his education and tastes as a pharmacist may interfere somewhat with his success as a merchant. The tastes which led him to a choice of pharmacy are not always those which most naturally conduce to success in mercantile life, and the conservatism and minute care which must characterize his work as a pharmacist do not naturally and congenially go hand in hand with the enterprise and push which are essential to success in business. As a result many druggists fail as merchants to attain results which, if sought in the same spirit with which merchants in other lines build up and extend their trade, would be easily within their reach. As educated pharmacists they occupy an honorable position, but are lacking in the mercantile spirit which is essential in trade." "The scientific and the mercantile are thus to go hand in hand, and in these days the druggist who neglects either, falls into a serious error."

In a subsequent editorial (Dec. 16, 1889,) the "Pharm. Record," speaking of the causes that have tended to make the drug business unprofitable, says: "The druggist, both wholesale and retail, seems to have reached a point where they are asking themselves whether life is worth living, and how, in these days of cut rates and over-generous business inducements, they can find that most desirable state of business matter, a favorable balance in their cash accounts." "But it is not the drug store alone that seems to be in this state of anxiety, for the daily press, that indicator of the popular feeling, has arrayed in bold and conspicuous type the evidences of the contention for more business and the constant depreciation of old-time methods and prices. So the druggist is not alone in the wrong as to how he can successfully conduct his business to make a satisfactory profit, nor is it likely that the future will bring that wholesome and satisfactory relief that he so earnestly desires." "The effort to crush out the demoralizing element that has reduced the profit and increased the expense of doing business is not likely to meet with rapid or permanent success because of the impossibility apparently of enlisting enough in any plan that would secure the desired end. There was a time in the beginning of the present contest when it might have been done, but the failure then to agree to any method is only the presage of what any effort to enlist the more widely different views to-day would result in."

The "Pharm. Era" (Feb., 1890,) observes that "pharmacy as now generally followed, presents two characteristic aspects. It has a professional and a mercantile or commercial side, each of which must be conducted in accordance with the principles and methods attaching thereto. The professional side embraces that division where the skill and learning of the pharmacist in all that pertains to the art of compounding and dispensing medicines must be applied, for which he is competent only from long study and training. For the conduct of this branch of laboratory and dispensatory he is heavily responsible morally and legally. The mercantile side demands business ability, but in no greater degree than is necessary in other divisions of trade." Speaking of the influences that have made the mercantile side less remunerative, "the question at once obtrudes, what must be done to remedy the matter?" A few points are offered as perhaps worthy of consideration: "In the first place, is it not useless to attempt to regain control of the several lines of trade that have escaped us? On many articles there is no longer a living margin of profit, unless they be handled in large quantities, as in the bazars. Do not attempt to get back the trade in these goods, keep just enough to satisfy current demand, and sell at the prices asked elsewhere. His former lucrative trade in certain perfumes, face powder, toilet articles, patent medicines, is gone from the druggist, and he must consider what to do to replace it." "Trade can be attracted by judicious advertising, not in the papers, but in the store itself. An artistically dressed window, frequently changed in arrangement, attracts as many customers as a shabby, dirty, dingy window repels. Let people know you have something to sell by exposing it in such a way as to attract attention." "There are many lines peculiarly the druggist's, many articles giving good profits if sold in sufficiently large quantities, and upon which he need fear no competition. One hundred pounds of licorice, bought at a low price, exposed in bulk in the window and sold (as it quickly will be) at five cents a stick, is preferable to keeping scanty stock, in a dark drawer, for which ten cents per stick is demanded. Select some article giving a fair profit, buy a quantity of it, call the public's attention to it as a bargain, and it will be sold. Then another article can be pushed, and so on, through a long list that may be selected. Business methods in buying, business methods in selling, business methods in all matters pertaining to the business of a drug store must be followed, if we expect to receive our portion of the trade in lines open to every merchant."

In a second editorial (April 1890) the "Pharm. Era" observes: "The pharmacist has been strangely slow in realizing that much of his business has drifted away or has been taken away from him: but stranger still is it that he has been so tardy in efforts to remedy matters. He fumes and frets because the grocer sells beef extracts, the dry-goods man sells toilet articles and sundries at low prices; yet he maintains his old-time war prices, and wonders that the public will not crowd his store. Trade in certain lines of goods has undeniably been diverted from the drug store, and it can only be brought back by meeting competitors on their own ground. If you cannot meet the bazar prices on cosmetics, soaps, perfumes, etc., resign yourself to seeing this business leave you, for it is inevitable. The public will buy where it can buy cheapest. But there are other lines of trade that are peculiarly the druggist's, for which he alone is fitted by training and education. There is a branch of the drug business that, with care and judgment can be made to yield handsome profits, viz., that of druggists' specialties. Success rewards the efforts of those who are quick to seize and act upon ideas in this direction. Instead of selling Tom, Dick and Harry's tooth powder, of which you know nothing more than what advertising circulars state, make an article that you can recommend as the best, put it up tastily, and call the attention of your patrons to it."

Pharmacists as Analysts.—The "Drug. Cir." (Dec. 1889), speaking of the field of analytical work that is open to pharmacists by reason of their superior training in this direction, says: "Partly from the competition incident to the increase in the number of schools of pharmacy in this country, and partly from the gradual elevation of the standard of scholarship required abroad, each year notes advances towards the higher and more thorough education of our pharmacists through the introduction of new branches or the extension of old ones in the curriculums of the various schools. One of the most notable advances has been made in the line of analytical chemistry. At first it was tried tentatively, courses being optional, next it was recognized in the final examination, and now nearly, if not quite all, of the schools, require not only an examination, but at least a certain minimum of time devoted to the work in the laboratory." "The suggestion that pharmacists should hold the posts of public analysts, which was made by the President of the British Pharmaceutical Conference at the recent meeting of that body, suggests one practical application, aside from its utility in his own business, of whatever knowledge of analysis the student of pharmacy, whether in school or out, may be able to gain." "The government supervision of foods and drugs in this country is in its infancy, and now is the time when under the stimulus of a more intelligent comprehension of the laws of hygiene the pharmacist can make himself felt as a power of good. The need of supervision of food and drink, as well as of drugs, is shown by the results of every systematic and intelligent investigation which is carried out. Other countries protect their citizens against the cupidity of unscrupulous manufacturers by the enforcement of stringent laws against adulteration or the importation of adulterated articles." "By preaching and practicing purity as an essential in all things, and by warning the public against all sorts of adulterations wherever heard of, the pharmacists can do much toward arousing the public sentiment and bringing about concerted action against adulteration and sophistication of food and drugs. Then let him be prepared and competent to take up the duties of public analyst, and his services to the public, even though they do not receive direct commensurate remuneration, will be more than compensated for by the increased confidence and respect with which the public at large will come to regard him, and his services will bring a prestige which will do much to accentuate the line of demarcation between pharmacy and the purely commercial pursuits with which it is usually associated in the public mind and with which it has unfortunately to contend for its existence."

Elevation of the Professional Status of Pharmacy.—The "Western Druggist" (April, 1890), expresses its belief "in the elevation of the professional status of pharmacy, and that this can be best attained by material prosperity conjointly with scientific advancement. As has been frequently pointed out, opportunities are presented to pharmacists in connection with the inevitable enactment of anti-adulteration laws, superior to any in the history of pharmacy in any other country. They have it in their power by supporting anti-adulteration legislation which would make qualified pharmacists district agents of the government, not only to insure the intelligent enforcement of the law, but also to provide for practice in work for which they have been trained, and are, as a rule, eminently qualified. Among the nearly ten thousand graduates in pharmacy in the United States, at least one thousand persons could be selected, in as many different districts, thoroughly competent to render at least preliminary examinations of all substances brought for inspection. Three such persons in each congressional district properly located would at once enable the vast millions to avail themselves of their services. If the examination disclosed any violation of the law the case should be reported to a thoroughly qualified state chemist for further action. In this manner a national anti-adulteration law could be made most effective, and in a short time be available to the whole people, at but little cost."

Demands on Modern Pharmacy.—The "Western Druggist" (Aug., 1889), observes that "there is a conservative element in the medical profession which consists of physicians who never try the new therapeutic agents until they have been thoroughly tested by other medical men and recommended as worthy of use by busy practitioners. Such doctors pay but little attention to what the medical formularies say about new alkaloids, chemicals, etc. While a physician may follow such a course and retain the confidence of his patients and meet with even more than ordinary success in life, the druggist must exercise a more inquisitive inclination if he is to meet with that financial success which all covet. A pharmacist may be careful about new pharmaceutical processes, and hesitate when about to order the patent percolators, stills, drug mills, tincture presses, etc., but he must keep posted in regard to new medicines which he may be called on to dispense at any time. The doctor thinks well of the druggist who can give him ready information about the dose, physical, chemical and pharmaceutical properties of some new remedy which he has just decided to try." "It is just as essential for the druggist to keep posted up to date as it is for a daily paper to print the latest news."

In the October number (1889) the "Western Drug." says: "There never was a time when the druggist needed current literature in the form of pharmaceutical formulas more than at the present day. The market is flooded with new remedies of all kinds. Some are synthetical, some are analytical, some are vegetable drugs, but the doctors are prescribing all of them, and looking for new preparations of them, as well as information, such as druggists are able to give about the older remedies. The standard works of reference contain but little to help the druggist out, so he must depend upon the visits of the journals for his store of information."

Relations of Medicine and Pharmacy.—Speaking of the failure of the American Medical Association, at its meeting in 1889, to organize a Section in Pharmacy, the "Western Drugg." (July 1889), remarks that, "unfortunately the American Medical Association regards the apparent anxiety of pharmacists in the consummation of this object as a desire for recognition, chiefly for the purpose of discussing certain grievances which both prescriber and dispenser are more or less credited with harboring against one another. But, fortunately, the professional element, at least in American pharmacy, views such an undertaking from an entirely different standpoint, while a large proportion of druggists would like to see an arrangement where, upon common ground, the evils of counter-prescribing, self-dispensing and other amenities, those engaged in the handling of drugs or practicing medicine are subjected to. The profession of pharmacy asks for recognition, not for itself, but for the science and practice it represents. It is upon this broader principle that pharmacy should be recognized as one of the very essential cognate science of medicine, and not upon a pessimistic trade organization basis."

That the "Western Drugg." is in error if it regards the abandonment of a Section on Pharmacy in the American Medical Association as final, must become evident from the following remarks of the "Drugg. Circ." (July 1889): "The establishment of the proposed Section of Pharmacy in the American Medical Association was at their recent meeting in Newport postponed for another year. So far as could be learned, there was no special opposition to this new movement, but the necessary changes in the by-laws were unfortunately reported along with other alterations which were objectionable, and the whole matter was deferred together. The general impression is that this new Section will be inaugurated next year. The next meeting of this Association will be held at Nashville, the third Tuesday in May. A committee was appointed to invite the American Pharmaceutical Association to meet with them hereafter." And, speaking on the same subject, the "Amer. Jour. Pharm." (Sept. 1889) says that the delegation sent by this Association to the American Medical Association, at the recent meeting in Newport, R. I., to confer upon subjects of mutual interest to both professions, were warmly received by the Medical Association. A series of resolutions were passed which are indicative of a disposition to meet this Association half way in devising plans for considering and relieving any differences that may exist between the professions, and a Committee of Conference has been appointed to meet the Committee of this Association for the consideration of subjects of mutual interest and benefit, and it is believed that some plan will be devised by which provision will be made for regular conferences at stated times.

Drug-store Architecture and Decoration.—The "Amer. Drugg." (July 1889), in continuation of a series of papers on drug-store architecture and window decoration, etc., heretofore contained in its pages, publishes a very interesting paper, showing the possibilities in the direction of altering and changing premises, otherwise not suitable for the purpose, in a manner securing not only convenient arrangement and compactness, but also a very effective display in the line of architecture and artistic decoration. Several such drug stores that have recently been so fitted up are mentioned. Referring to the resumption of the publication of this series of papers, attention is drawn to the most lamentable want of taste in the disposition of their stock to the best advantage by many druggists. "Goods which are in themselves attractive are jumbled together with no more regard to the impression that they may produce upon the passer-by than is shown by the teamster who unloads a lot of building materials, and we are led to wonder that any one can have so little regard for his business interests."

Window Dressing.—The "Pharm. Record" (May 5, 1890) observes that "Window dressing is really a fine art in the way of tempting the purchaser, attracting the passer-by, impressing the locality of the store upon the memory, or introducing some new and desirable specialty to the public. It is not enough for the pharmacist to have a good reputation, a neat store, well appointed arrangements to facilitate business, he should also make the exterior speak of the merit, taste and stock which he has to dispose of, and there is no way that he can do this with more intelligence, taste and profit than by a judicious round of display in his store windows." There are stores "which have their store windows severely plain, depending rather on reputation and an established business, which holds its own against competitors." "Others, while just as jealous of their reputation, and proud of their business, are more awake to the fact that the public appreciate the taste displayed, and the innovations which the rush of the present period demand make frequent changes, and place attractive articles of vertue, a large quantity of some special article of merchandise, medicinal or otherwise, and follow this at brief intervals with other equally interesting stocks." A third variety of window dressing—becoming altogether too common—"is that of covering the glass of the windows with tawdry signs of cheap merchandise, of prepared medicine, or within the windows of articles of doubtful merit, objectionable goods, or show cards of theatres, or popular actors or attractions." This last variety of window dressing is objectionable and degrading.

Sunday Closing of Drug Stores.—The "Pharm. Era" (Nov., 1889,), in calling attention to a recent news item in which it is stated that "want of medicine which could not be obtained on account of the compulsory closing of drug stores by selectmen" is a portion of a physician's death certificate in a Massachusetts town, has occasion to remark that there is much of reason and sense in the charge made by the local paper from which the news item was clipped, that the fault is not so much with the "Blue Laws," which required the closing of the drug store, as with the physician, who went totally unprepared for his business. While not advocating a return to the customs of the "good old times" when the doctor carried with him a more or less complete drug store, it is argued that he should be prepared for sudden emergencies of accident or dangerous crises of disease. In thus speaking, the editor disclaims any intention to antagonize the druggist or to advise dispensing by physicians, but speaks in behalf of humanity. The line between dispensing by the doctor and prescribing by the druggist cannot be sharply drawn, there being often occasions when either is justified, even compelled, to depart from the rules customarily controlling his actions. As to the action of the selectmen who thus would close drug stores against the demand of the sick or suffering, the editor remarks that language cannot be too strong in condemnation. It is eminently right and proper to place a ban upon Sunday selling of cigars, soda-water, sundries, etc., but provision should always be made for supplying remedials and filling prescriptions for disease.

The "Amer. Jour. Pharm." (Dec., 1889), has the following to say on the subject of an early closing: "Under the stimulus of sharp competition a number of drug stores in our larger cities have found it necessary and profitable to keep their places of business open day and night. In the majority of these cases it is probably not so much a strictly pharmaceutical business, but rather the sale of accessories which are generally kept on hand, that enables this extension of business hours to be carried on without pecuniary loss, or even with actual profit. The curtailing of business hours by early closing in the evening, and limiting the Sunday labor to stated hours, which measures have been frequently agitated in the past years, has, in the main, been unsuccessful in our large cities. It will be of interest to learn that in the city of Stuttgart, Germany, which, in 1885, had 126,000 inhabitants, all the pharmacies are closed at nine o'clock in the evening since October 1st. As a matter of course, provision has been made for proper night service; but thus far the experience has been that between the hours of nine and ten the services of the night clerks have been very rarely required, the public generally approving of the earlier closing."

Symbols in Prescriptions.—Speaking of a recent mistake in a prescription in which a *scruple* of water was dispensed when a *pint* was intended, the "Drugg. Circ." (Oct., 1889), observes that "this absurd and laughable mistake of course arose from an adherence to the antiquated system of designating quantities by learned-looking but barbaric symbols. It is not at all difficult to confound ℈j with Oj, nor ʒj with ℥j for that matter. The common-sense method of indicating quantities in a recipe is to write them out in such a way that no mistake can occur, thus following the excellent example long since set by the most authoritative of our pharmacal works—the Pharmacopœia itself. When the prescriber writes 'one dram' there is not the remotest possibility that, however bad the chirography, any dispenser will take the direction to be 'one ounce.' The general application of this rule would do away with an objection which has been brought against the metric system. It has been urged that the great danger lies in the misplacement of a dot. There is much force in this argument, yet we do not think that the Americans who are so patriotically opposed to the foreign decimal system of weights and measures, often make the mistake in using the American decimal system of currency, of writing the figures for one dollar when they mean ten cents. If, however, the plan of writing out the names of the units and the quantities required were universally adopted, the danger lurking in the decimal point would be wholly extinguished."

Fidelity to Prescriptions.—The "Western Druggist" (Nov. 1889), says: "There are many perplexing questions which are ever coming up to trouble the druggist and remind him that the practice of pharmacy is not a mere trade, as some have contended, but has a professional side to it. Among them is one in regard to altering physicians' prescriptions. When, if ever, is it desirable to do so? Our advice is never to tamper with the documents. If they cannot be dispensed as written, then do not put them up. If the physician cannot be seen, it is better to refer the prescription back to the customer. Some contend that it is right to change a mixture slightly when it will not affect the medicinal properties, but will make a better pharmaceutical mixture. Such cases frequently occur, but they are just the ones which may cause the druggist the most trouble. The doctor may think it wrong and make it uncomfortable for the druggist, and the patient may have seen the mixture before, or have been told how it should look. In the latter case the druggist gets the worst of it. It is perfectly right and proper to know how to correct a prescription and call the prescriber's attention to it, but, above all things, do not alter it on your own responsibility."

Speaking on the same subject, the "Pharm. Record" (Nov. 18, 1889) says that any departure from the direction of the physician in the dispensing of his prescription must be regarded as "an unwarranted conclusion." "There may be circumstances in which it would be well to decline to prepare one, as when it is evident that the administration of the dose indicated would lead to a fatal termination." "But it would be your duty if the error is palpable to correct it, and say nothing beyond a private whisper in the ear of the physician to guard him against its repetition."

Criticizing Physicians' Prescriptions.—The "Amer. Jour. Phar." (March, 1890) draws attention to a case of general interest to physicians and pharmacists which came before one of the Pennsylvania courts during February. It appears that a physician had written a prescription calling for Potass. bromide, 2 drachms; Tinct. Aconite root, 12 drops; Spir. of Nitrous ether, 2 drachms; Morphine Sulphate, 1½ grains; Peppermint water, ½ oz., and syrup sufficient for 3 oz. Dose, 2 teaspoonfuls every 2 hours in water. The clerk receiving the prescription is stated to have refused to dispense it, remarking to the messenger that it would kill her, and afterwards explaining in a note written by him that the ingredients were likely to produce an insoluble hydrobromate. The physician brought suit by capias against the proprietor of the store to recover damages for the loss of his reputation as a careful physician. When the case came up, the Judge, in deciding it, said that the plaintiff's affidavit, upon which the suit was based, did not allege that the druggist acted in bad faith in refusing to compound the prescription; that a druggist is to be commended who is cautious in such matters, and that he is not liable in a suit for damages under the circumstances.

"The above gives the legal aspect of this case. There is, however, also an ethical side to it. The action of the clerk, if correctly reported, was obviously not only hasty, but quite discourteous. There is no need to point out to the experienced apothecary that there is no danger arising from an insoluble precipitate, if the above prescription is carefully dispensed. But, even if the clerk's surmise had been correct, a different course of action would have been more becoming."

Organized Protection to Combat Frivolous Charges of Error Against Apothecaries.—The "Amer. Drugg." (Aug. 1889), speaking of the action of one of the local New York Pharmaceutical Societies in appointing a committee whose duty it is to take cognizance of any action at law that may be brought against a member of the Society, and to see that legal advice will be provided at the expense of the Society in case the defense is a just one, makes the following remarks in this direction: "It is notorious that the number of frivolous charges against apothecaries for supposed errors committed in dispensing has increased of late years. No dispensing apothecary is safe from such attacks, which generally are instigated by ignorant, illiterate, or misinformed persons. In some cases, it is true, the frivolity of the charges, nay, even their ridiculousness, is clearly brought out when it comes to trial—if it comes so far. But what is to recompense the accused party for the vexation, annoyance, loss of reputation and patronage, and expenses? Surely, an acquittal, however welcome it may be, is no equivalent. Though it may not deter designing persons hereafter from maliciously prosecuting members of the pharmaceutical profession, it will, at least, make the burden of the defense—if it be an honest one—lighter to bear by making every member of the Society bear a share of the expense. It is merely a sort of insurance association against unjust and expensive legal prosecutions."

Official Recognition of Patented Synthetics.—Speaking of the possible admission of some of the patented synthetics into the U. S. Pharmacopœia, the "Western Druggist" (Feb., 1890), observes that "as long as nothing more definite is known concerning these synthetic compounds than the published patented process, and the manufacturer's own test for identity, purity and strength, they should go without recognition." "No progressive pharmacist will object to the introduction of chemical substances made by patented processes, especially since we have outlived the patentable period of one of the first and most valuable of these—salicylic acid. But such processes must be honestly and carefully furnished, and be of a character that will stand investigation. What has been done in this direction is given in a review by the "Pharm. Era," (Jan., 1890) of Prof. Samuel P. Sadtler's very interesting lecture on the

Synthesis of Alkaloids.—Prof. Sadtler forcibly shows what has been accomplished in this department. He mentions that several years ago it was stated that certain discoveries pointed strongly to the derivation of many of the alkaloids from either pyridine (C_5H_5N) or quinoline (C_9H_7N). This relation has since been clearly established in numerous cases, several alkaloids having been made synthetically from pyridine and its derivatives. On the other hand, it has been demonstrated that certain organic bases found in the vegetable kingdom stand in much closer relation to the bases found in the animal organism, such as urea, than they do to the other plant bases. Thus caffeine and theobromine are undoubtedly urea derivatives, while quinine and morphine bear no relation thereto, but are pyridine derivatives. It has, therefore, been proposed by Königs to limit the name alkaloids to the second of these two classes, and to be defined as those organic bases found in the plant kingdom, which are pyridine derivatives, and it is believed this will be the gradual practice as the different plant bases become more fully studied. The synthesis of alkaloids has acquired the dignity of a distinct department of chemistry, in its complexity and extent parallel to the study of coal-tar and petroleum. Brief reference is made to some of the newer results of the past few years. Clearer ideas of the general underlying compounds have been obtained. It has been seen that the compounds, pyridine (C_5H_5N), quinoline (C_9H_7N), and acridine ($C_{13}H_9N$), correspond to benzene (C_6H_6), naphthalene ($C_{10}H_8$), and anthracene ($C_{14}H_{10}$), and have analogous relations with each other; that the stability and behavior towards reagents of analogous derivatives, for instance of benzene and pyridine, exactly correspond; that the reducibility of the molecules is perfectly analogous. As from benzene hexahydrobenzene is obtained, so from pyridine hexahydropyridine; as from naphthalene tetrahydronaphthalene is obtained, so from quinoline tetrahydroquinoline; as from anthracene dihydroanthracene, so from acridine dihydroacridine. These are also in each case the most stable of the hydrogen addition products. Of the derivatives of pyridine, one of the simplest and best studies is hexahydropyridine, or piperidine, as it proves to be. It can be formed from piperine, the alkaloid of pepper, direct from pyridine, by the action of reducing agents, or from pentamethylene diamine. Conine, the alkaloid of hemlock, has been made synthetically and shown to be the dextro-rotary α normal propylpiperidine; nicotine is a derivative of dipyridyl $(C_{10}H_8N_2)$, and is apparently hexahydrodipyridil $(C_{10}H_8(H_6)N_2)$. Then, the study of atropine, the synthesis of cocaine from ecgonine, the decompositions of narcotine and cinchonine, provide further evidence of the correctness of the hypothesis advanced regarding the nature of the composition of alkaloids. The author states further, that of even greater present interest is the manufacture of a large number of synthetic organic compounds which, while not generally basic or alkaloidal, are equally active, physiologically, in a variety of ways. These, the hypnotics, antiseptics, antipyretics, analgesics, etc., he groups according to their chemical relationships, as follows: First, the derivatives of methane (CH_4), including most of the hypnotics and anæsthetics, as methylene, paraldehyde, urethane, sulphonal, uralium, chloralamid. Second, phenols and allied compounds, resorcin, hydroquinone, thioresorcin, α and β naphthol, sozoiodol, the three cresyl salicylates, guaiacol. Third, phenyl derivatives, including hypnone, acetanilide, phenacetine, pyrodine, antithermine, saccharin, exalgin, methacetin, hydracetin, a class somewhat mixed in character, but seeming in general to be antipyretics and sedatives. Fourth, pyrrol and pyrazol derivatives, antipyrin; and fifth, quinoline derivatives, as kairoline, kairine, thalline, thermifungin, etc.

Proprietary Articles and Trade Marks.—The "Amer. Drugg." (Oct. 1889) calls attention to a decision of the Judge of the U. S. District Court for Missouri, holding that the proprietors of "Bromidia" have no case against certain infringers, who were charged with selling an imitation of "Bromidia" and labeling it by this title. If this decision is sustained by the U. S. Supreme Court, the whole trade in registered, proprietary and trade-marked articles will be revolutionized and completely altered. The decision of the U. S. District Judge is quoted in full.

Prohibition of Secret Remedies.—The "Amer. Jour. Pharm." (Nov. 1889) observes: It is well known that in Germany the sale of nostrums is in various ways discouraged by the authorities, and to some extent restricted. By a ministerial decree of August 17, the apothecaries of Prussia are permitted to sell such secret remedies which contain neither poisonous nor otherwise dangerous ingredients, and the price of which does not exceed that allowed by the legal medicine tax. Quite recently (Sept. 27, 1889), the provincial authorities of Schleswig have gone a step further, and decreed that the offering for sale at retail and the furnishing of secret remedies be entirely *prohibited.* It is not likely that such a radical measure will materially affect the solution of the nostrum question.

Sale of Poisons.—The "Pharm. Rundschau" (Dec. 1889), in view of the fact that with the introduction of disinfectants, particularly of carbolic acid, accidents by poisoning have become more numerous from year to year, reviews the character of the responsibility to which the pharmacist is or may be subjected; the laws pertaining to the sale of poisons, and the precautions that should be observed, independent of those prescribed by law. Certain necessary precautions are formulated, and may be briefly stated as follows:

1. A supply of printed Rules for the Sale of Poisons, based upon existing laws, together with instructions respecting the sale, marking and delivery of poisons, should be kept on hand, and copies placed in prominent and convenient positions. Co-operation may secure such at a nominal price.

2. The employé who is entrusted with the sale of poisons should be provided with two copies of these Rules, and after he has carefully read the same, he should be required to return one of them to the proprietor with his signature and acknowledgment that he is familiar with its contents. This is a safe-guard in case of law process.

3. The labeling should be most careful, all precautionary marks being appended. Thus, for instance, besides the label indicating the substance—with the word poison, directions for applying antidote, etc.—there should be an extra strip label bearing the word "poison" on the package or bottle, and if the latter, a cork-top should also be affixed, bearing the legend—"Poison."

4. Poisonous agents should at all times be placed separately and distinctly from all other remedial agents.

National Adulteration Bill.—The "Amer. Jour. Pharm." (June 1890), after giving a synopsis of a national adulteration bill pending before Congress, remarks: "We do not believe that there was ever in any country a law framed which, under the pretense of preventing adulteration, was equally crude and at the same time oppressive. It is obvious that under the guise of proprietary articles of food and drink—'the formulas of which shall not be made public'—adulteration could be carried on to an unlimited extent even with the apparent sanction of the Government. While the bill defines the terms food and drug, it is silent as to the meaning of the terms compound food and compounded drug. The bill evidently intends that substances derived directly from the animal or vegetable kingdom, like tea, coffee, rice, milk, meat and the like, be regarded as simple articles of food. But bread, cakes, candy, chocolate, etc., are not such simples, and since they are 'manufactured, manipulated, compounded or mixed articles,' it would seem that a license would be required for transporting them from one State to another. In regard to medicines the bill speaks of compounded drugs (not compound). But whether a drug be comes compounded by dividing it in packages of (say) one ounce or pound each, or only after dividing it into separate doses, the proposed law gives no information; nevertheless, a license would be necessary if compounded drugs be shipped to another State, and even pharmacopœial compounds could thus be taxed, because they are not specially exempted. Several bodies have protested against this proposed measure, and a committee of the Philadelphia Drug Exchange and of the National Wholesale Drug Association explained their view in opposition of the bill to the Senate Committee on Agriculture, and submitted as an acceptable substitute a bill drawn upon the lines of the British law."

The "Amer. Drugg." (June 1890), speaking upon the same subject, remarks that a careful reading of the text of the bill "will show that it is capable of much improvement, and that it should undergo decided modifications before it is allowed to become a law. Committees of the National Wholesale Drug Association and of the Philadelphia Drug Exchange have already met, resolved, sent delegates to Washington, reported, resolved further, and will doubtless prevent the enactment of the bill as it stands. Meanwhile, some of our contemporaries seem more inclined to use billingsgate and abuse than sober argument when speaking of the measure; and this is to be regretted, for it is calculated to impress the promoters of the bill with the belief that the arguments against it and the needs for modification are not of much account, and that the writers are following the advice given by a sagacious lawyer to his pupil, that when his client had "no case" on which he could base an argument before a jury, he should "abuse the counsel of the opposite side."

Tax-Free Alcohol in Hospitals.—In a former editorial (March 1889), the "Amer. Drugg." announced a decision of the Treasury Department regarding the use of *alcohol free from internal revenue tax*, which appeared to enable hospitals to obtain and use this costly commodity at a comparatively low price. Since that time, however, one of the editors has gone through some practical experience which induces the journal quoted (Sept. 1890) to issue a friendly caution to those who have already applied the above mentioned Treasury decision in their own case, or who contemplate doing so. After making out the application in proper form, explicitly explaining the uses to which the alcohol was to be applied, the information was received from the Secretary of the Treasury, that, "if it could be shown to the satisfaction of the proper Government authorities that the institutions for which the tax-free alcohol was intended are 'a chartered or incorporated *scientific institution* or *college of learning*,' or 'that they are a *scientific university* or *college of learning* created and constituted such by any State or Territory under its laws, though not incorporated or chartered,' then the necessary permission would be granted to withdraw alcohol from bond free of tax." The difficulty thus in the way will be readily appreciated, and it made it impossible in the case quoted to prove any right to the use of tax-free alcohol under the existing law, though several of the principal New York hospitals were concerned in the application.

Proper Spelling of Chemical Terms.—The "Amer. Drugg." (Oct., 1889), protests against the dropping of the letter *e* in chemical terms ending with *ide*, by the authors of the new Century Dictionary. Thus oxide is given *oxid*, chloride is given *chlorid*, and similarly the words anhydrid, dioxid, etc., are substituted for anhydride and dioxide. The spelling with *ide* is given with each leading term, as an alternative, but in the body of the text the spelling with *id* is always used. The practice of pronouncing various chemical terms in this manner prevails among English-speaking chemists who have been educated on the continent of Europe, but is not likely to be adopted by the vast majority, who will continue to spell such terms as *iodide*, *sulphide* and *anhydride* with the ending in *e* as heretofore.

American Development of Technical Chemistry in its Relation to Chemical Societies.—The "Pharm. Rundschau" (July 1889), reviews the progress made in the development of industrial chemistry, and discusses a recent project for the formation of a National Chemical Society, having evidently the aim of uniting reputable American chemists in a sphere of usefulness similar to that attained by the Chemical Societies of Great Britain, Germany, and other European countries. Chemistry, which formerly was fostered by pharmacy and medicine, has long since outgrown these, and has attained an independent and dominant position among the natural sciences. While at one time France, and then England occupied the foremost positions in the field of technical chemistry, and supplied the most important chemical products to the rest of the world, the supremacy in this field is now occupied by Germany. In the United States also considerable strides have been made in this direction, but the development of industrial chemistry was retarded largely by the scarcity of scientifically educated experts. With the increased competition from abroad, however, the necessity for conducting technical processes on a more scientific basis soon manifested itself, and recent years have shown a marked advance in the scientific attainments of American chemists, not alone in the field of technical chemistry, but likewise in that of education and of pure science. Efforts have been made at different periods within the past two decades to unite the chemists of the United States for the furtherance of scientific interests, but, with the exception of a few local Chemical Societies, no progress appears to have been made, and there exists at the present time no American Society that in some degree represents or embraces the chemists throughout the land. Among the reasons given by the editor for this failure are the following: The vast extent of our country, and the consequent difficulty for members to attend the annual meetings, may be mentioned as a prominent obstacle. So also the circumstances that "chemists," so-called, differ very widely in their general, as well as professsional attainments, and follow the most varied occupations. Under these and other considerations mentioned by the editor, the opinion is expressed that a union of American chemists is best effected through the medium of the American Association for the Advancement of Science. This Association, as is known, embraces a Section of Chemistry, which offers a sufficient field to American chemists for the publication of scientific papers, the discussion of such and of scientific questions, and for social intercourse. The meetings of this Association are annually held at the most convenient time for all parties concerned, and, being attended by members representing every branch of the Natural Sciences, afford advantages, scientifically as well as socially, that cannot be offered by any other Association.

Preliminary Examination in Colleges of Pharmacy.—Referring to the articles of W. Bodemann upon the Present Conditions of Pharmaceutical Education, read at the San Francisco meeting of this Association, and of Dr. Eccles on the Method of Examination, read at the Detroit meeting, the "Pharm. Rundschau" (Sept. 1889) publishes, in contrast to what seems to be required on this side of the Atlantic, the questions propounded by the Pharm. Society of Great Britain at the "preliminary examination" to applicants for admission to the School of Pharmacy, and expresses the opinion that it is a moderate view to assume that 3 per cent. of the students of the American Colleges of Pharmacy, with the exception of three colleges connected with universities, could correctly answer these questions when applying for the final degree of the college. In further comment it is stated that efforts have been made from time to time to regulate the matter of preliminary examinations for admission to the schools of pharmacy, as well as those for the final degree of such institutions, but all such have been futile, and all that remains is that most of the colleges, following their own course, which is often dictated by expediency, make more or less pretence to strict preliminary or final examinations.

Preliminary Examination.—Attention is drawn in the "Pharm. Era" (Nov. 1889,) to a recent enactment by the New York State Legislature of a law compelling the Regents of the University of the State of New York, or trustees of any medical school or college within the State, before conferring the degree of Doctor of Medicine upon any person who has not received a Baccalaureate Degree in course from a college or university duly authorized to confer the same, to require of such persons to file with the Secretary or recording officer of their university or college, a certificate showing that prior to entering upon the prescribed three years' study of medicine, he passed an examination conducted under the authority and in accordance with the rules of the Regents of the University of the State of New York, etc., etc. The editor remarks: "It would be a matter for congratulation were such, or more stringent, restrictions imposed upon schools of pharmacy, though many of these have already seen the error of their ways, and have gone cautiously and slowly to work to elevate their professional standard by beginning, in the only true way, at the bottom; a good physician or pharmacist can be made from good material only.

The Illinois Pharmacy Law.—The "Phar. Rundschau" (July 1889), discusses the causes which have led to the recent amendment of the Illinois Pharmacy Law, and criticizes the amendment unfavorably. It regards the Friesbie amendment as the result of the strict and possibly too conscientious execution of the law of the Board of Pharmacy, and a proof that when a law, that in itself is a proper and good one, is executed too strictly, it is regarded to be, or becomes a burden, and meets with inevitable resistance. With the exception of the inordinately high tax for examination and registration, the original law is regarded as one of the best pharmacy laws that have been framed. The amended law partakes of the nature of a compromise between the dissatisfied elements and the advocates of the original law, and enacts many of the features that have been found objectionable in the pharmacy laws of other States. And, though the amended law may be a welcome compromise to the majority, and may prove satisfactory for the present, it can in no sense be regarded a progress resting upon a solid foundation.

Association Exhibits.—The "Phar. Era" (June 1890), expressing itself earnestly in favor of pharmaceutical exhibits in connection with Association meetings, observes that "there is a feature of the exhibition question which is almost entirely disregarded, yet is one worthy of first and most thoughtful consideration. This is the matter of the exhibition of goods of the pharmacist's own manufacture, illustrating his skill and proficiency in the manipulation of daily store practice, as well as his scientific attainments. So far as we know, this feature has characterized but very few exhibitions at the meetings of pharmaceutical associations, and in these instances to but a very limited extent. At the meeting of the American Pharmaceutical Association in Detroit, in 1888, a prize was offered for the best display of pharmaceuticals of retail pharmacists' manufacture; there were but two or three competitors. In a few States, students of schools of pharmacy have made very creditable displays. On the whole, however, there has been but little accomplished in this direction. The line of work indicated, if properly carried out, would add immensely to the interest of these annual gatherings, by stimulating healthy and friendly rivalry between the members, adding largely to one's knowledge of pharmaceutical methods and manipulations, and contributing materially to the advancement and elevation of the arts of manufacture and dispensing. Just how the matter can best be managed is for solution by those to whom it commends itself."

Queries.—The solicitation of the Chairman of the Committee on Papers and Queries, by resolution of this Association at San Francisco, that members communicate to him such queries as they should like to see answered at the next meeting, has called forth a criticism from the "Pharm. Rundschau" (Oct. 1889) in which it is pointed out that the "statistics, which are accessible to all, make it evident that the system of queries has sadly failed to attain the purpose for which it was designed." "That the plan has outlived its period of usefulness, in the National Association at least, is sufficiently demonstrated by the urgent solicitations or importunities which are made each year on the part of the respective committees in the endeavor to secure scientific or literary contributions from its members." "The system of queries, which we believe does not exist in any similar organization other than the Pharmaceutical Associations of the United States, may be well adapted for apprentices, or for quiz-classes of youthful students, but is certainly out of place in any organization which may assume for its members a higher degree of intelligence and proficiency."

It has been the aim of the reporter in the foregoing to classify the subjects under discussion correctly—with indifferent success, however, owing to the diversity of subjects. In the following, which constitutes the report proper, and which will be found to well represent the pharmaceutic progress during the past year, the usual classification has been adhered to. But even here it may be found that absolutely correct scientific classification has been sacrificed to convenience, so that kindred subjects could be brought more closely together.

PHARMACY.

A. Apparatus and Manipulations.

WEIGHTS, MEASURES, SPECIFIC GRAVITY.

Weights and Measures—Proposition to Conform Fluid Measures to the Value of Troy Weight.—Joseph W. England, after drawing attention to the opposition to parts by weight in the construction of pharmacopœial formulas, and to the deeply-rooted preference of English-speaking pharmacists to dispense solids by weight and fluids by measure, discusses the adaptability of the different systems of weights and measures in the construction of the formulas of the forthcoming Pharmacopœia. He believes that the metric system might have been successfully introduced, or, at all events, its eventual use secured, if the Committee of Revision of 1880 had boldly adopted the gram for solids and the cubic centimeter for liquids, but considers it unwise to do so now, and, therefore, advocates for adoption by the Revision of the Pharmacopœia of 1890:

1. The use of weights, grains and troy ounces for solids, and measures, minims and fluid ounces for liquids; each minim in distilled water at its maximum density, etc., to weigh exactly one grain, and each fluid ounce 480 grains.

2. The use of a percentage plan in the framing of formulas.

If this proposition is adopted, the solids would be weighed by the old grain and the old troy ounce, but our liquids would be measured by a new minim and a new fluid ounce, which latter would each be 5.33 per cent. greater in volume than before, and liquid preparations made with them, therefore, would be 5.33 per cent. weaker in strength of drug, with the exception of fluid extracts. These, since each c.c. is now made to represent 1 gm. of the drug, or 100 per cent. by volume, *would remain unchanged in strength.* For example, if each fluid ounce (new standard) was made to represent one troy ounce of the drug, it would indicate 100 per cent. by volume just the same.

By the use of a percentage plan we could have 10 troy ounces of drug represented in 100 fluid ounces (new standard) of liquid, or 10 per cent. by volume, and thus conforming practically to the present standard.—Amer. Jour. Pharm., April 1890, 187–192.

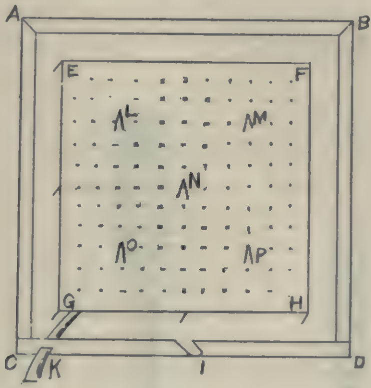
Measures—Cleansing.—A. McKellar makes some suggestions concerning the cleansing of measures, etc., that have been used for measuring, or as containers of different fluids. The following list of detergents, while not exhaustive, is trustworthy:

Character of Stain, etc.	Solvent.
Aniline dyes, e. g., fuchsine, marking-ink, etc.	Sol. acid. tart.
Deposits in bottles from fluid magnesia.	
Parrish's syrup, syr. Eastonii, etc.	Acid. hydrochlor.
Opium and cinchona preparations.	
Tr. benzoin co. storax, and most vegetable mixtures.	Liq. potassæ.
Tar, copaiba, tr. cannabis indicæ.	Turpentine.
Old paint and grease on clothes.	Chloroform.

For cleaning greasy ointment slabs nothing is equal to methylated spirit on cotton, followed by thorough washing with soap and water. The opaque film that occasionally forms in the water bottle, being chiefly of an organic nature, is at once removed by sulphuric acid, which also—diluted—instantaneously dissolves off the dirty scum so often found on opal pots, the process being attended by a very palpable evolution of H_2S. Two of the dirtiest bottles in every shop are those of liq. plumbi subacet. and tr. ferri perchlor. For the former strong acetic acid is recommended, but iodide of potassium in small quantity, forming iodide of lead, and subsequent rinsing out with ammonia, answers admirably; while for the latter, although hydrochloric acid helps, nothing but hard rubbing makes a good job. The dark stain left in a mortar in which Ethiops mineral has been made is only partially erased by hydrochloric acid, but a liberal application of elbow-grease and a piece of pumice-stone are needed to complete the renovation. The dimness observed in old liquor potassæ bottles, being due to the chemical action of the alkali on the glass, is not removable. Greasy ointment pots are best treated with dry sawdust, and bone tallies, ink-stained and yellow, are converted into blanched blanks with the aid of dilute hydrochloric acid. "Chem. and Drugg." Feb. 22 1890, 249.

Measures—Washing Arrangement.—A correspondent of the "Chem. and Drugg." (July 6, 1889, 28) describes the measure washer shown by Fig. 11, as follows: A B C D is a zinc tray 13 inches square and 1 inch deep. E F G H is a sheet of perforated zinc, standing on short legs (¾ inch long). I is the outlet for waste water. K is a lead pipe ¾ inch bore running on bottom of tray, under perforated zinc, and branching into five pipes, which terminate in the jets L M N O and P, through the perforated zinc. The jets stand up above the drainer 1¼ inch. It is connected to the tap by a rubber pipe.

FIG. 11.

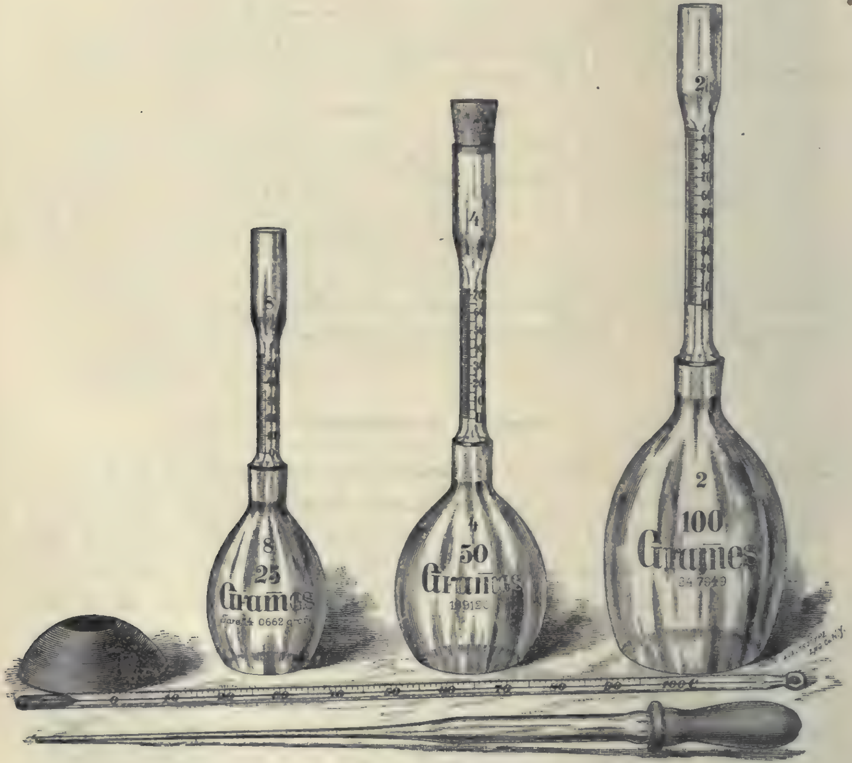


Washing Arrangement.

Specific Gravity Bottles—Modified Construction.—Dr. E. R. Squibb describes the specific gravity bottles shown by Fig. 12, which he had made with the view to their applicability to taking the specific gravity of liquids at different temperatures. It is well known that the specific gravity of liquids is usually determined from the weight of a volume of the liquid at a certain temperature, as compared with the weight of an equal volume of pure water at the same temperature. This standard volume of water for unity in comparing, varies in different nations and under different circumstances, being in Continental Europe generally taken at its maximum density (40°C.), in Great Britain at 15.6°C. and 16.667°C., while in this country the latter standard is usually employed, together with that adopted by the United States Pharmacopœia (1880), namely, 15°C. In addition to these, Dr. Squibb has proposed that all specific gravity be taken at 25°C. and compared with water at that temperature, on the ground of its convenience, it being possible to quickly take the specific gravity at all times of the year, and without resorting to ice or other refrigerants.

The peculiarity of these specific gravity bottles consists in that the tube-stopper is lengthened out so that the central channel will permit the bottle to hold the volume of water at any temperature between 4° and 25°C., thus adapting it to all the standards in use, including that proposed by the author. The tube-stopper between these points is graduated to half millimeters or less, and at the top, above the scale, it is expanded, so as to allow room for the expansion of light liquids, without loss, when the bottle is adjusted at 4°C., and weighed at higher temperature, the expanded portion being loosely closed with a cork during the interval between the adjusting and the weighing, this cork being removed, of course, during the weighing. Explicit directions for the construction of these bottles are given. The bottle and stopper having been numbered to keep them

FIG. 12.



Specific Gravity Bottles—Modified Construction.

together, and the capacity mark put on, they are made chemically clean by concentrated sulphuric acid, water, alcohol and ether rinsings, in the order named, and, when perfectly dry and cold, are tared on a fine balance to the fourth decimal place, and the tare is etched on the bottle under the capacity weight, as shown in the cut, in which is shown, also, a leaden collar that goes over the neck of the bottle to keep it steady in the bath, a thermometer for the bath, and a fine pipette with rubber nipple that is useful in the adjustment of the liquid to the mark. The fine adjustment is more conveniently made with a narrow strip of blotting paper.

In consequence of the contraction which occurs in glass during the first year or two after it has been heated, every close observation made with any given specific-gravity bottle which is not known to be correct after it is two years old, should be preceded by a verification of the bottle.—Ephemeris, July 1889, 1162–1167.

Specific Gravity Bottle—Modified Construction for Use in Tropical Climates.—C. J. H. Warden observes that the specific-gravity bottle, with a capillary fore-stopper, cannot be used in Bengal because for a greater part of the year the temperature is usually between 80° and 95° F., and the air highly charged with moisture. Under such conditions, when a specific-gravity bottle is filled with liquid, cooled to 15.5° C., and the capillary fore-stopper inserted, the bottle cannot be immediately weighed, because, owing to the extreme humidity of the air, water is condensed on the surface of the bottle far too quickly to admit of even very rapid weighings, and by the time the temperature of the liquid has reached that of the balance case it has necessarily expanded, and a large amount escaped through the capillary orifice in the stopper. In order to obviate this difficulty he had ground on to the neck of the bottle a light glass cap, with a capillary orifice at the top, of sufficient capacity to hold 4 or 5 c.c. when using a 50 gm. bottle. The bottle is filled with the cooled liquid in the usual way, the capillary fore-stopper inserted, quickly wiped, and the glass cap fixed tightly on the neck. The bottle is then allowed to reach the temperature of the air, the expanded liquid forced out through the capillary orifice in the stopper, being prevented from escaping by the cap, the capillary orifice in the top of the cap allowing the displaced air vent. Obviously it is very essential that the glass cap should be most accurately ground on to the neck of the bottle.—Chem. News, Nov. 15, 1889, 236–237.

Specific Gravity—Determination in Case of Viscous Fluids.—Dr. Ad. Geniser proposes the following manipulation in order to overcome the difficulties ordinarily encountered in taking the specific gravity of viscous fluids: The viscid liquid is first gently warmed (care being taken that no notable loss of water may occur) so as to render it more thin fluid, then passed through a wire sieve (to remove impurities, if necessary—for instance, in the case of molasses), and enough of the strained liquid poured into a specific gravity bottle to fill it about two-thirds full. Supposing the pycnometer had weighed, empty, 24.6506 gm., and with the syrup or other viscid liquid 79.4420 gm., it would, therefore, contain 54.7914 gm. of the syrup, etc. Next the pycnometer is cautiously heated in an oil-bath, or preferably in a salt solution of such density that its boiling point is somewhat above that of the syrup, until the latter actually boils. By keeping it at this temperature a few minutes, all air bubbles will be driven to the surface and there form a thin scum. The bottle is now cooled to 17.5° C. (ab. 64° F.), and then a little distilled water added, which will speedily form a clear layer between the air-free syrup and the scum, and the latter will rapidly be dissipated, as it consists of air bubbles. The pycnometer is then completely filled with distilled water and weighed. Supposing it should weigh 89.766 gm., it follows that, not counting the evaporated water, there were added 89.766—79.442=10.324 gm. of water. Supposing, further, that the pycnometer is known to hold exactly 50 gm. of water at 17.5° C. (64° F.), it follows that the syrup within the pycnometer occupied the same space as 50—10.324=39.676 gm. of water. Hence its specific gravity is 54.7914 : 39.676, or 1.38097. "Amer. Drugg." March 1890, 52; from *Zeitsch. f. angew. Chem.*, 1890, 44.

Specific Gravity—Determination in the Case of Salts Soluble in Water.—According to J. W. Retgers, the discrepancies in the published specific gravities of salts that are soluble in water are traced to the want of homogeneity of the salts in question, and the imperfection of the method employed. To obtain perfectly homogeneous crystals of a salt, the author puts them in methylene iodide and dilutes the liquid gradually with benzene, stirring diligently. The crystals which sink first are selected. Being the heaviest, they may be considered the purest, being free from inclosed particles of mother-liquor and air. The specific gravity of these selected crystals is then determined in Thoulet's liquid—a solution of potassium-mercury iodide in water.

"Chem. News" Feb. 28 1890, 109; from Ztschr. f. Physik. Chem. III, No. 4.

FILTRATION, ETC.

Filter—A New Fold for Rapid Filtration.—Reginald A. Fessenden describes a new method of folding filters for rapid filtration, which, presenting a large surface, will suggest itself as useful for pharmaceutical, as well as chemical operations. The accompanying cuts (Figs. 13, 14, 15, 16, 17), aid the author's explanation, which is as follows: The filter-paper is folded three times; folds Nos. 13 and 14 are towards the reader, No. 15 from him. The filter is then gathered (Fig. 14), and a piece of glass rod, bent at a very acute angle, inserted in the cleft of the filter (Figs 13 and 14), thus giving a filtration surface of nearly four times the usual one.

The filtration being complete, the glass rod is grasped by the projecting ends and lifted from the funnel, bearing the filter upon it. One end of the filter-paper is then bent down, and the precipitate is easily washed off (Fig. 17)—Chem. News, Aug. 30, 1889, 102.

FIG. 13.

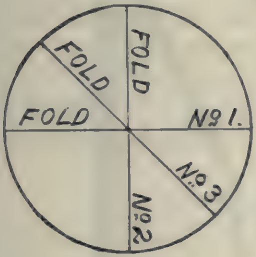


FIG. 14.

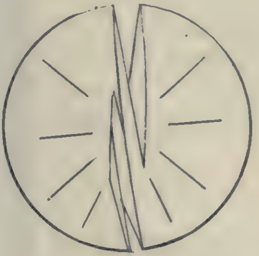


FIG. 15.

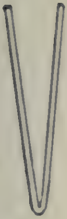


FIG. 16.

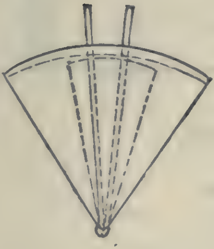
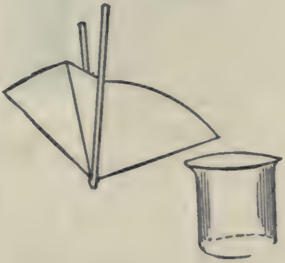


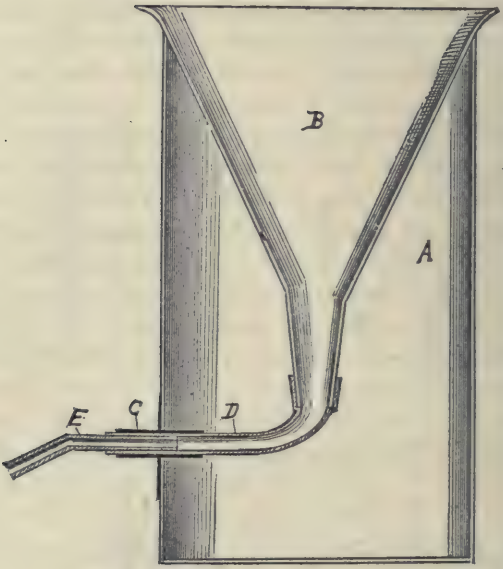
FIG. 17,



Hot Filter—Cheap Construction.—John A. Forrest has devised a hot-funnel, shown by Fig. 18, which he finds to answer the purpose of a hot-water funnel jacket, and is easily and cheaply constructed. The funnel, being in direct contact with the water, its contents are much more rapidly heated than in the case of the ordinary jacket, with its intervening tin or copper. One drawback, however, is its fixity when in use—the funnel cannot be removed without emptying the bath. The one the author has in use was made out of an old vaseline-tin, the brass tube being the neck of a disused spirit-lamp.—Chem. and Drugg., June 14, 1890, 802.

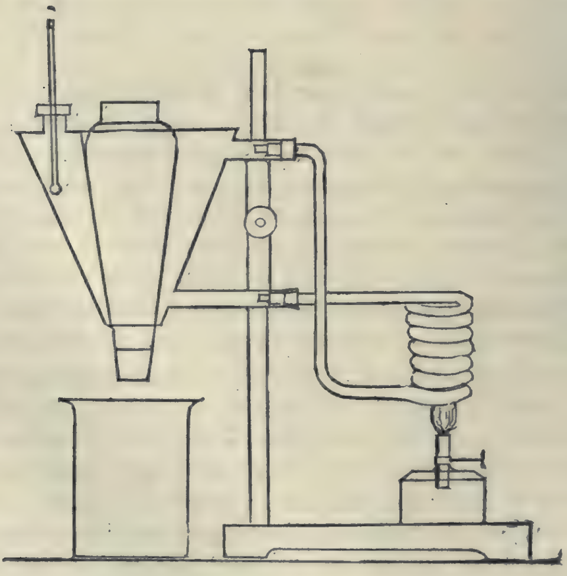
Hot-Filtering Apparatus—H. J. Burton describes an apparatus for filtering gelatine solutions, which is adaptable for any other solutions requiring heat. The filter proper is made from a lamp glass, and the filtering-medium may be absorbent cotton or any other suitable material. The apparatus, as will be seen from the sketch (Fig. 19), consists of a double cone of tinned plate, the inner cone reaching one inch lower than the outer. Three brass tubes are soldered in as shown, and two of them fitted with good wine-bottle corks; these are perforated to take the ends of the coil,

FIG. 18.



Hot-Funnel.

FIG. 19.



Hot-Filtering Apparatus.

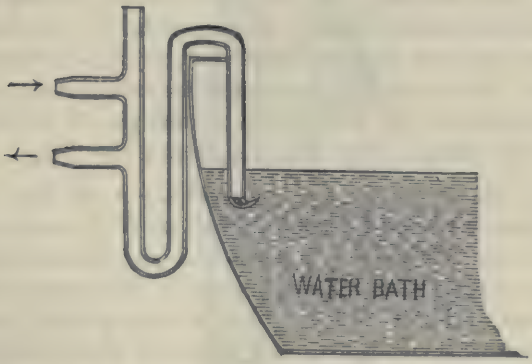
the latter being made of three-eighth compo pipe, filled with sand, and rolled on a piece of three-quarter wood roller. The other brass tube is for taking the thermometer, the latter passing through a piece of cork which then rests on the top of the tube. The size of the apparatus may be taken from the lamp glass, which is ten inches long. In selecting a lamp glass, take care that it tapers towards the small end; those with parallel sides will not do, as the plug is liable to drop through when the weight of liquid is poured upon it. The plug should be placed about one to one and a half inch from the lower end of glass.—Chem. and Drugg., May 5, 1890, 597; from the Br. Jour. Photographic Almanac.

APPLICATION OF HEAT, ETC.

Evaporation—Automatic Apparatus.—F. E. Ray describes and figures an automatic apparatus for evaporation. The evaporating dish is suspended on a stick, counterpoised by dry sand placed in a bucket, then the proper weight of liquid is counterpoised by an additional quantity of sand. The liquid to be evaporated being then introduced into the evaporating dish, an elastic band is connected with the end of the stick from which the dish is suspended, and from which a string passes to the gas-faucet when heat is applied. When the excess of liquid has evaporated, the falling of the sand-bucket causes the closing of the gas-faucet, and the elastic band swings the dish to be removed away from the sand-bath.—Pharm. Rec., Sept. 2, 1889, 263.

Water-Bath—Maintenance of Constant Level.—T. H. Easterfield describes the following arrangement for keeping the water in water-baths at a constant level. This arrangement, which is shown by Fig. 20, consists of a piece of glass tube, open at each end, bent twice parallel to itself, and having two side-tubes sealed into the longest limb. The upper side-tube

FIG. 20.



Water-Bath.

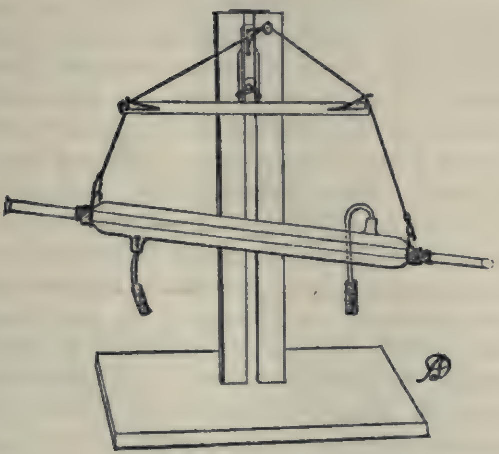
admits the water supply, the lower is the overflow pipe. When the tube has once been filled with water, by turning on the water supply and stopping the overflow pipe for a moment, the instrument acts as a continuous syphon, keeping the water-level constant.—Chem. News, Nov. 22, 1889, 250.

Wire-Gauze Air-Bath—Construction.—F. Muck describes an arrangement for applying a gentle or strong heat to small quantities of liquid in large vessels. It consists of a rectangular frame of iron resting on four feet, about 22 c.m. in height, a movable sheet-iron box (about 60 × 20 c.m.) with a bottom of wire gauze, about as fine as that used in safety-lamps, four wire gauze shelves, and four Bunsen burners. If a gentle heat is required, the flames are reduced and the vessel is set upon the highest of the four shelves.—Chem. News, Jan. 17, 1890, 36; from Chem. Ztg.; Ztsch. Analyt. Chem., 1889, Part 5, 611.

New Condensing Apparatus.—Dr. Carl Schlarb has constructed a modification of the Liebig condenser, the salient points of which consist in the union of the condenser and receiver. The apparatus consists of a bell-shaped globe, into which a U-shaped receiver is introduced, which leaves the globe in the shape of a separatory funnel. For the sake of cheapness a rubber tube may be attached and occlusion secured by means of a simple metal clamp. The globe is supplied with tubes below and above for the passage of the cooling water. The U-shaped receiver is also provided with two tubes, one of which acts as a safety valve, and is provided with a stop-cock beneath for the withdrawal of the distillate. The condensing receiver is particularly adapted for the distillation of volatile oils; if these are lighter than water, one of the tubes or openings is closed, and the watery portion of distillate is withdrawn from time to time through the stop-cock; if, on the other hand, the oil is heavier than water, the tube is left open, and the watery distillate escapes, while the oil collecting at the bottom of the receiver may be withdrawn at the stop-cock by the aid of a rubber tube. The cooler may also be used for refrigeration, a thermometer being introduced and the refrigerating mixture placed in the surrounding globe.—Western Drugg., July 1889, 247, from Chem. Ztg.

Condenser Stand—Improved Construction.— A. H. Allen describes an improved form of condenser stand, devised by W. Chataway and himself, which allows the condenser to be reversed at any moment without disconnecting the distilling flask, while it permits of the contents of the latter being agitated whenever desired. This is accomplished by hanging the condenser from a stout leather thong (Fig. 21), which passes over three small brackets attached to a piece of wood working vertically in a slot in the stand. The thong can be fixed by means of a screw at the end of the centre bracket.—Amer. Drugg., Nov. 1889, 211; from J. Soc. Chem. Ind.

FIG. 21.



Condenser Stand.

FIG. 22.

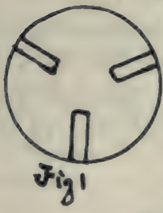
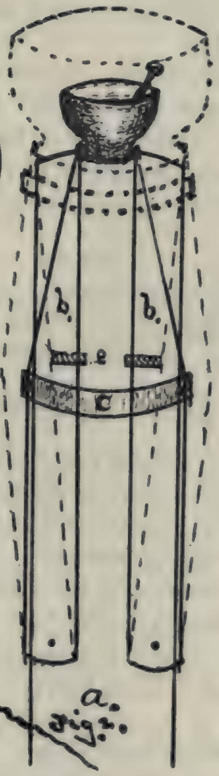


FIG. 23.



Mortar Support and Clamps.

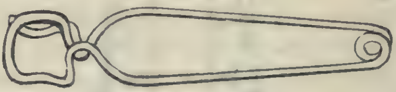
GENERAL LABORATORY WORK.

Mortar Support and Clamp—Construction.—Prof. A. B. Stevens draws attention to the device shown in the accompanying cuts (Figs. 22, 23) which is designed for holding a mortar firmly in position while triturating substances. It also affords a solid support for the mortar while powdering drugs. The block *a* should be six inches in diameter, with three grooves on the sides at equal distances from each other; each groove is one inch wide and two inches deep. (Fig. 22 represents a section of the top.) The arms *b*, *b* (Fig. 23), should be placed in these grooves and secured, at the lower end with a pin; the upper ends of the arms should extend ¾ of an inch above the block; on the inside of the arms above the block are placed pieces of rubber. The mortar is placed on the block, and may be firmly held in place by pressing down the ring *c*, which forces the ends of the arms against the mortar. The block should be well fastened to the floor, or better still, let it pass through the floor and rest on the floor of the cellar. The most convenient place for such a support is in the edge of the prescription counter, but not connected with it, lest the force of the pestle should jar the counter and its accessories. When not in use a cap of wood may be fitted over the top in such a manner that it shall be just even with the top of the counter.

The dotted lines represent the ring raised to the top and the arms opened to receive a larger mortar. The arms are opened by the coil springs *e*, when the ring is raised.—Phar. Era, Jan. 1890, 18.

Test Tube Holder—Construction.—J. T. Stoddard recommends the test tube holder shown in the accompanying cut (Fig. 24), which presents many advantages over the wooden holders ordinarily in use. It is made of brass wire, and opens by pressure on the straight sides of the handle; its jaws open to the width of 5 c. m., and it holds firmly any tube from 5 m. m. up. It thus serves for ignition-tubes, as well as for all sizes of test-tubes. Larger sizes are convenient for holding flasks, wash-bottles, etc.—Chem. News, May 9, 1890, 223; from Jour. Anal. Chem., Jan. 1890.

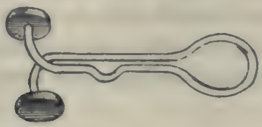
FIG. 24.



Test Tube Holder.

Pinchcock—Modified Form.—J. T. Stoddard recommends a modified form of pinchcock, which is shown by Fig. 25. The modification consists in making a side bend in one of the limbs, and omitting the double wire which serves as a guide in the ordinary form. The pinchcock can be opened by springing the limbs apart, and thus is readily put on a tube connected at both ends without breaking connections; and when placed so that the tube lies in the side bend, leaves the tube open while retaining its place.—Chem. News, May 9, 1890, 224; from Jour. Anal. Chem. Jan. 1890.

FIG. 25.



Pinchcock.

Labels—Removal from Bottles.—A. M. Kellar observes that for taking off soiled labels from bottles, the most expeditious and effective plan is first to wet the label thoroughly, and then cautiously hold the bottle over a gas flame, when, as a rule, the label will peel off. In some high-class pharmacies a steam jet is used for this purpose, but the humbler method is quite as successful. Labels on liniment bottles, &c., are often so soaked with oil that when a repeat is wanted the prescription-book number is indecipherable; in that event rub label lightly with a piece of cotton, then moisten with benzine, and dry above a gas flame, when in nine cases out of ten the figures will become legible.—Chem. and Drugg., Feb. 22, 1890, 249.

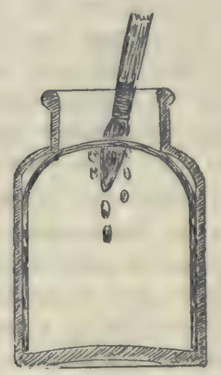
Paste—A Good Formula for Pharmaceutic Purposes.—John F. Patton observes that the commonplace but useful adjunct to every drug store—paste—deserves more attention than is usually accorded it, and recommends the following formula as affording a paste which serves every variety of purpose likely to come up in a pharmacy, being among others well adapted for pasting labels on tin or other smooth surfaces. Take of—wheat flour, 1 pound; alum, 120 grains; borax, 120 grains; hydrochloric acid, 1½ fl. ounces; water, 1 pint. Mix the flour, alum and borax, and stir to a smooth paste with water; then add the acid and heat until the starch cells break, stirring constantly. This makes a very thick paste, which must be thinned with water as wanted for use. A small quantity of essence of wintergreen poured over the paste in stock will preserve it indefinitely.—West. Drugg., Nov. 1889, 414; from Proc. Pa. Phar. Assoc., 1889.

Paste—Useful Formula.—F. E. Ray gives the following useful formula for preparing paste for store use: Flour, 4 ozs.; gum arabic, in powder, 1 oz.; glycerin, 1 f. oz.; salicylic acid, 60 grains; water, 2 pints. Mix all in a mortar, pass through a sieve, boil a few moments with constant stirring to prevent burning; avoid contact with iron. This paste will be found greatly preferable to most of those in general use.—Pharm. Rec., Sept. 2, 1889, 263.

Gum Bottles—Prevention of the Gumming-up of the Mouths.—To prevent the troublesome gumming-up of the mouths of cement and gum bot tles, the "National Druggist" (July 1, 1889, 4), after trying many devices, finally hit upon the plan of doubling a bit of whalebone in such a manner that when inserted into the bottle it would form a yoke or arch; the transverse upper portion of which crossing the neck of the bottle in the center, furnishes a support upon which the brush or other instrument for removing the liquid may be pressed, instead of in the mouth of the bottle. It is well shown in the cut (Fig. 26). A piece of corset whalebone one-quarter of an inch wide and one-sixteenth inch thick, is strong enough for all practical purposes.

Gelatinous Bottle Wax—Formula.—The "Photo. Review" observes that in storing volatile liquids, which are solvent of resinous material, the ordinary bottle wax in which bottle necks are commonly dipped is generally inadmissible by reason of the solvent action of the liquid upon it. In such cases the following answers admirably, giving a perfect closing; and, moreover, the top is easily pared off with a knife when the bottle is to be opened:

FIG. 26.



Gum Bottle.

Soft gelatin or good glue	3 parts.
Water	9 "
Glycerin	2 "

Melt the gelatin in the water and then stir in the glycerin. Any coloring matter can be added, and the bottle necks should be quite free from grease. A second dip can be given if requisite, and the top can be stamped while soft with a slightly greased metal seal, or warm stereotype (slightly oiled), or an india-rubber stamp.—Amer. Drugg., March 1890, 56.

B. PREPARATIONS.

GENERAL SUBJECTS.

Incompatibility in Prescriptions.—Joseph W. England communicates an interesting paper on incompatibility in prescriptions. He says: "Incompatibility in a prescription has been defined as that condition in which there exists either 'a chemical decomposition, a pharmaceutical dissociation, or a therapeutical opposition' of its constituents. The term is thus susceptible of three meanings. A prescription is chemically incompatible, when chemical change results; it is pharmaceutically incompatible, where there is violation of correct pharmaceutical procedure; and there is therapeutical incompatibility where there is antagonism in physiological action. Now, accepting these definitions, a prescription may be chemically incompatible and yet be just what the physician wants. It may be pharmaceutically incompatible and yet be desirable for the same reason. But it is never compatible where there is a change of chemical composition and pharmaceutical character resulting in the formation of new products having totally different therapeutical effects from those obviously intended. And this view—the intended therapeutical action of the prescription—is the 'keystone of the arch' and the best rule for the pharmacist to follow."

"Every new prescriptionis largely a law unto itself until tried. Expertness in pharmaceutical manipulation, of which prescription work is the highest type, is a matter of individual ability which can be acquired, only in the largest and best measure, by personal experience. The subject of incompatibles is not a formidable one, if there primarily exists a clear knowledge of the chemical and pharmaceutical properties of the substances used, so that any deviation from the right standard may be detected; but here is the puzzling question: How are we to know but that, in the event of some chemical or pharmaceutical change, the physician does not mean just such a change, and nothing else?"

"At first glance it seems strange, but there are some most successful physicians who, every now and then, write, pharmaceutically and chemically, the most incompatible prescriptions. Yet they have success. And their happy results can only be due to the formation of certain new products or an alteration in pharmaceutical character of old ones. It does not follow that all prescriptions, thus written are of the highest therapeutical value. Far from it. The tendency of the times is steadily in the direction of greater simplicity in prescription writing."

Concerning special instances of incompatibility, the author has devised a set of "notes," and they have been found of such good service that he communicates the same in the present paper, in "Amer. Jour. Phar.," Jan. 1890, 1–5. In concluding the author says: "What to do with an incompatible prescription is a question for individual judgment, and cannot here be entered into. The usual practice, in the event that the prescription involves no serious change, is to accept the situation and dispense as written. On the other hand, where some serious change is liable to take place, it is almost superfluous to state that it is the duty of the pharmacist to consult the physician before dispensing."

Unofficinal Formulary of the B. P. C.—The British Pharmaceutical Conference, 1889, has added to its Unofficinal Formulary, formulas for the following preparations:

Acidum Hydrocyanicum (Scheele).
Acidum Hypophosphorosum.
Chloroformum Aconiti.
Chloroformum Belladonnæ.
Chloroformum Camphoratum.
Elixir Sennæ.
Extractum Hæmatoxyli Liquidum.
Syrupus Calcii Hypophosphitis.
Syrupus Sodii Hypophosphitis.

These several formulas are reproduced under the proper headings in the report, and are indicated by the affix: U. F. B. P. C.

New Remedies—Maximal Doses.—The following table, which is stated to have been compiled principally from B. Fischer's "Neuere Arzneimittel" (Berlin, 1889), quoted in part in last year's report (in Proceedings, 1889, 365); and from Professor Aurep's and Dr. Voromikin's "Russian Medicinal Agenda," (1889, I), will be found useful for reference, and may properly find place here. It must be stated that all the sizes of dose in this table are calculated for administration by mouth only.

MEDICAMENT.	Maximal Adult Dose, by Mouth.			
	SINGLE.		DAILY.	
	Grams.	= about Grains.	Grams.	= about Grains.
Acid, Cubebic	1	15	5	75
" Hydrobromic, diluted (10 per cent.)	*forty*	*drops.*	*one hundred drops.*	
" Iodic	0.3	4½	1.2	18
" Per-osmic	0.015	¼	0.05	¾
" Sclerotic	0.06	1	0.25	4
" Valerianic	*ten*	*drops.*	*forty*	*drops.*
Adonidin	0.006	1/10	0.03	½
Agaricin	0.015	¼	0.05	¾
Allyl Tri-bromide	*eight*	*drops.*	....	....
Aloin	0.3	4½	0.6	9
Amylene Hydrate	4	60	8	120
Anemonin	0.03	½	0.1	1½
Antifebrin	1	15	3	45
Apiol, crystallized (*solid* Parsley-camphor)	1	15	4	60
Apo-Codeine	0.03	½	0.08	1¼
Apo-Morphine Hydrochlorate	0.01	⅙	0.05	¾
Arbutin	1	15	4	60
Arsenic Bromide	0.01	⅙	....	....
" Iodide	0.01	⅙	....	....
Asparagin	0.1	1½	0.3	4½
Aspidospermine Hydrochlorate	0.003	1/20	0.006	1/10
Baptisin	0.03	½	0.1	1½
Bebeerine Sulphate	3	45	10	150
Benzene (Benzol)	1	15	6	90
Berberine Hydrochlorate	0.06	1	0.25	4
Boldo-glucin	4	60	12	180
Butyl-chloral Hydrate	1	15	4	60

MEDICAMENT.	Maximal Adult Dose, by Mouth.			
	SINGLE.		DAILY.	
	Grams.	= about Grains.	Grams.	= about Grains.
Cannabine Tannate	1	15	2	30
Cannabinon	0.1	1½	0.3	4½
Carbon Bi-sulphide	*ten*	*drops.*	*forty*	*drops.*
" Tri-chloride	0.5	7½	2	30
Cerium Oxalate	0.3	4½	1	15
Chrysarobin	0.005	1/12	0.015	¼
Cocaine Hydrochlorate	0.15	2¼	0.5	7½
Colocynthin	0.4	6	0.8	12
Coniine Hydrobromate	0.005	1/12	0.03	½
Convallamarin	0.06	1	0.3	4½
Cotoin	0.08	1¼	0.5	7½
Daturine	0.001	1/64	0.003	1/20
Duboisine	0.001	1/64	0.003	1/20
Erythrophleine Hydrochlorate	0.01	1/6	0.3	½
Ethyl Bromide	*twenty*	*drops.*	....	....
" Iodide	*twenty*	*drops.*	....	....
Ethyl-oxy-Caffeine	0.65	10	2	30
Euonymin (Evonymin—the pure *Resinoid!*)	0.5	7½	1	15
Fluid Extract: Boldo	1	15	3	45
" " Cabbage-tree Bark (from *Andira inermis*)	2	30	6	90
" " Cascara Amarga (Honduras bark)	4	60	10	150
" " " Sagrada (Chittem-bark)	4	60	10	150
" " Damiana (Turnera aphrodisiaca)	5	75	20	300
" " Golden Seal (Hydrastis)	2.5	38	10	150
" " Grindelia robusta	3	45	20	300
" " Kava-Kava (Piper methysticum)	0.65	10	2	30
" " Lily of the Valley (Convallaria majalis)	0.5	7½	1.5	23
" " Piscidia (Jamaica Dogwood)	5	75	15	225
" " Witch-hazel (Hamamelis)	10	150	....	....
Fuchsin	0.25	4	0.5	7½
Gelsemine Hydrochlorate	0.005	1/12	0.015	¼
Guaiacol	0.1	1½	0.5	7½
Hasheesh	0.1	1½	0.3	4½
Helenin (*solid* Elecampane-camphor)	0.3	4½	1	15
Helleborein	0.03	½	0.12	2
Homatropine Hydrobromate; or, Sulphate	0.03	½	0.25	4
Hydroquinone (Hydrochinone)	0.8	12	1.5	23
Hyoscine Hydrochlorate	0.001	1/64	0.003	1/20
Hyoscyamine Sulphate	0.001	1/64	0.003	1/20
Hypnone (Aceto-phenone)	0.5	7½	1.5	23
Ichthyol	1	15	4	60
Iodine Tri-chloride	0.012	1/5	0.08	1¼
Iodol	0.2	3	1	15
Iridin	0.2	3	0.5	7½
Kairin	1	15	4	60
Menthol	1	15	5	75
Mercur-Thymol Acetate	1.01	1/6	0.12	2
Mercury Bi-chloride peptonized	0.03	½	0.1	1½
" Cyanide	0.03	½	0.1	1½
" Form-amidated	0.03	½	0.1	1½
" Phenate (Carbolate)	0.03	½	0.1	1½
" Salicylate	0.03	½	0.1	1½
" Tannate	0.1	1½	0.3	4½
Methylal	4	60	S	120
Naphthalene	1	15	4	60

MEDICAMENT.	Maximal Adult Dose, by Mouth.			
	SINGLE.		DAILY.	
	Grams.	= about Grains.	Grams.	= about Grains.
Naphthol, Beta-	1	15	4	60
Nickel Bromide	0.5	7½	1.5	23
Nitro-glycerin	0.001	1/64	0.005	1/12
Par-aldehyd	4	60	. . .	. . . .
Parthenicine	0.2	3	1	15
Pelletierine Sulphate; or, Tannate	0.5	7½	5	75
Pereirine Hydrochlorate	1.5	7½	2	30
Phen-acetin (para-acet-phenetidin	1	15	2	30
Picrotoxin	0.006	1/10	0.02	⅓
Piperine	0.6	9	1.2	18
Podophyllo-toxin	0.02	⅓	0.06	1
Potassium Osmate	0.015	¼	0.05	¾
Propylamine, *so-called*, see Tri-methylamine	. . . .	. . . .	. . .	. . . .
Pyridine	. . . .	. . . .	*twenty-five drops.*	
Quinoline (Chinoline) Tartrate	2	30	6	90
Resorcin	3	45	10	150
Salicin	2	30	10	150
Salol	2	30	10	150
Silver Cyanide	0.005	1/12	0.02	⅓
" Iodide	0.02	⅓	0.06	1
Solanine	0.1	1½	0.5	7½
Sparteine Sulphate	0.03	½	0.1	1½
Strophanthin	0.0002	1/333	0.0004	1/166
Sulphonal	4	60	8	120
Terpin Hydrate	0.3	4½	1	15
Terpinol	0.3	4½	1	15
Thalline Sulphate	0.5	7½	1.5	23
" Tartrate	0.5	7½	1.5	23
Tincture Strophanthus	1.5	23	5	75
Tri-methyl-amine *(erroneously called* "Propylamine")—10 per cent. *Solution*	3	45	10	150
Urethane	5	75	. . . .	. . . .
Xylene (Xylol)	2	30	. . . .	. . . .

—Amer. Jour. Phar., Sept. 1889. 488–490; from Merck's Bulletin.

ABSTRACTA.

Abstracts—A Plea for their Retention.—W. O. Posey, assuming that the introduction of "abstracts" into the Pharmacopœia was due to the idea of producing a class of preparations in which it was possible to establish a fixed basis upon which their doses might be determined, speaks a good word for their retention as a distinct class of preparations in the next Pharmacopœia. He says that when this system of abstracts was incorporated into the Pharmacopœia, it was evidently with the understanding that the habitat and thorough maturity of the drug should be specifically entertained, and all the details as to the time of gathering, drying and manipulation be observed in every particular, bringing in every particular the crude drug to the standard of excellence and medicinal value required by the U. S. P. and materia medica. With such a view of the matter it would seem, at so early a period of the existence of abstracts, to be an unwise course to urge their discontinuance, but rather seek to strengthen their position by encouraging physicians to a freer use of them in their practice, and preparing them ourselves from select drugs, so as to be in position to warrant them true to name and of best medicinal value.—West. Drugg., Nov. 1889, 405; from Proc. Louisiana Phar. Assoc., 1889.

ACIDA.

Aromatic Sulphuric Acid, B. P.—Incorrect Description.—R. A. Cripps states that aromatic sulphuric acid, B. P., when made strictly officinally, does not correspond with the specific gravity and acidity given by that Pharmacopœia. The specific gravity given in the B. P. is .911, the acidity "about 12.5 per cent. of real sulphuric acid." He found the specific gravity to be about .927 to .928, and the acidity about 13.8 per cent. real sulphuric acid. The acidity when calculated from the B. P. formula is equivalent to 13.89 per cent. of real sulphuric acid, or almost exactly the same as the author found it in practice. He therefore suggests the following amendment to the B. P. tests: "Specific gravity .923 to .929; 176 grains by weight require for neutralization 500 grain measures of the volumetric solution of soda, corresponding to about 13.8 per cent. of real sulphuric acid."—Pharm. Jour. and Trans., Jan. 11, 1890, 542.

AQUÆ.

Aromatic Waters—Use of Paper Pulp in their Preparation.—Ferdinand Lascar points out the objection to the present process of the Pharmacopœia, as well as to some of the other processes for preparing aromatic waters. Experiments made lead him to prefer the often recommended method of substituting paper pulp for cotton. To incorporate cotton homogeneously with the amount of diluted essential oil is far from being so easy a task as many suppose, especially if the quantity of cotton is employed which the Pharmacopœia directs. Many will smile skeptically at this assertion, but let some of my colleagues who possess a microscope try the experiment, let them proceed as the Pharmacopœia directs, and then compare different samples of such cotton. They will find that a part of the cotton is nearly free of oil, while in other parts the oil is very unevenly distributed. Far better is it to subject gray filter paper to sufficient heat to sterilize it, to mix the oil and alcohol mixture with sufficient water, and after having cut the filter paper into small strips, to shake it with the liquid in a suitable bottle till a perfect pulp has been obtained, and then add the remaining water and filter. The quantity of alcohol employed need only be 33 per cent. of the weight of the oil, and he firmly believes no objection can be raised against this minute quantity of alcohol. He prepared for comparison four different samples of water from four different essential oils, and submits the results without further argument, only remarking that the products were kept at the same temperature.

AQUA ROSÆ.

Pharmacopœial process (cotton) nine days, slightly clouded at the bottom of bottle.

Employing carbonate of magnesium, six days, slightly clouded at the bottom of bottle.

Phosphate of calcium, five days, slightly clouded at the bottom of bottle.

Paper pulp and boiled water, twenty-one days, no change. (Temperature about 100° F.)

AQUA FŒNICULI.

Pharmacopœial process, eight days, cloudiness at the bottom of bottle.

Carbonate of magnesium, seven days, cloudiness at the bottom of bottle.

Phosphate of calcium, five days, cloudiness at bottom of bottle.

Paper pulp, twenty-one days, slightest trace of cloud at the bottom of bottle.

AQUA MENTHÆ PIPERITÆ.

Pharmacopœial process, ten days, clouded at the bottom of bottle.

Carbonate of magnesium, eight days, clouded at the bottom of bottle.

Phosphate of calcium, six days, clouded at the bottom of bottle.

Paper pulp, twenty-one days, fresh as ever.

AQUA CAMPHORÆ.

Pharmacopœial process, twenty-one days, slightly clouded at the bottom of bottle.

Carbonate of magnesium, ten days, slightly clouded at the bottom of bottle.

Phosphate of calcium, ten days, slightly clouded at the bottom of bottle.

Paper pulp, twenty-one days, clear.

He found in examining the deposit from the waters prepared with carbonate of magnesium that in every instance it contained minute particles of the carbonate.—Drugg. Circ., April 1890, 76.

Creasote Water—Formula.—Bretter prepares creasote water by mixing 10 parts of glycerite of creasote (see "Glycerites") and 300 parts of distilled water.—Ztschr. Œster. Apoth. Ver., 1890, 138.

Cherry Laurel Water—Importance of Proper Preparation, particularly when dispensed with *morphine salts*, which see under "Organic Chemistry."

Chlorine Water—Decomposition.—Dr. G. Gore has recently made a communication to the Royal Society, in which he shows distinctly that the decomposition of chlorine water by light may be divided into two essentially different parts, or periods, of chemical change, and that the kinds of chemical change occurring during these two periods are largely different. During the first period, a very great and gradual *loss* of voltaic energy occurs, attended by formation of hydrochloric, hydrochlorous, and chloric acids. During the second period, a moderate and very slow *increase* of voltaic energy takes place, accompanied by decomposition of the hydrochlorous and chloric acids, a further formation of hydrochloric acid, and the production of peroxide of hydrogen. Under the influence of prolonged sunlight, the whole of the oxygen of the hydrochlorous and chloric acids united with water to form peroxide of hydrogen, and the peroxide then combined with the whole of the hydrochloric acid to form a definite "solution compound," represented by the formula $2HCl.H_2O_2$.—Chem. and Drugg., Dec. 14, 1889, 833.

Aerated Beverages—Effect of the Use of Nitrous Oil of Vitriol.—John Pattison calls attention to the effect of nitrous anhydride (N_2O_3) present in the oil of vitriol used for generating the carbonic acid required for aerating some ginger ale. It caused a turbidity of the fluid and a discharge of the color. A sample of oil of vitriol examined contained 0.027 per cent of N_2O_3.—Yearbook of Pharm., 1889, 388–390.

COLLODIUM.

Collodium—Method of Clarification.—According to Kranzfeld, collodium can be obtained perfectly transparent if it be agitated with carefully washed and ignited quartz sand; the effect is purely mechanical, the suspended particles with the sand forming a heavy gelatinous mass, from which the clear collodium is easily decanted.—Pharm. Ztschr. f. Russl., 1889, 392.

Collodium Cantharidini—Formula.—E. Dieterich recommends the following formula for the preparation of cantharidin collodium: One part finely powdered cantharidin is rubbed up with 40 parts castor oil, and dissolved with the aid of heat; after cooling, 40 parts acetone and 900 parts collodium are added, and then colored by addition of 10 parts tincture of cannabis. The acetone is used on account of its superior solvent action upon the cantharidin (which see).—Amer. Jour. Phar., June 1890, 293; from Pharm. Centralh., 1890, 264.

CONFECTIONES.

Purgative Chocolate—Preparation.—Giraud proposes a preparation made as follows: Cacao (powdered and freed from oil, 50 gm.; sugar (pulv.), 100 gm.; ol. ricini, 50 gm.; vanilla (pulv.), q. s.; make into tablets. The oil should be incorporated with the cacao, and the sugar and vanilla added; the ingredients must be well worked up upon a heated slab and allowed to cool in molds.—Amer. Jour. Pharm., Sept. 1889, 472; from Bull. Soc. Ph. Côte-d'Or, 1889.

ELIXIRS.

Elixir of Quinine, Iron and Strychnine Phosphate and Pyrophosphate—Modification of Formula.—F. W. Haussmann suggests the following modification of the formula for elixir of pyrophosphate of iron, quinine and strychnine, given in Parrish's Pharmacy, as yielding a splendid preparation, which is of a permanent green color, agreeable flavor, and mixes with water in all proportions without precipitation.

Strychnine (alkaloid)	gr. i.
Quinine sulphate	grs. lxiv.
Acid citric.	grs. v.
Alcohol	℥ iii.
Syrup	℥ vi.
Water	℥ iv.
Orange flower water	℥ iii.
Ferri Phosphate or Pyrophosphate.	grs. 256.
Soda Bicarb. a sufficient quantity.	

Triturate together the alkaloids and the acid, until thoroughly mixed. Rub this with the alcohol gradually added. Heat the syrup to about 150° F., add it to the alcoholic mixture and stir until clear. Dissolve the iron salt in the water, using heat if necessary, and add the orange flower water. Mix the two solutions, and, when cold, add carefully bicarbonate of soda in small portions, until the elixir is but slightly acid. Allow to stand a few hours and filter through white paper.—Phar. Era, Jan. 1890, 5.

Elixir of Senna—U. F. B. P. C.—

Take of—

Alexandrian senna	1 pound
Refined sugar in coarse powder	12 oz.
Rectified spirit Distilled water	of each a sufficient quantity.

Mix 4 fluid ounces of rectified spirit with 12 fluid ounces of water, and with it moisten evenly the senna. Pack tightly in a closed vessel, and macerate for three days. Express forcibly, and pour the product on the sugar. Break up the marc, and add to it sufficient of the same menstruum to furnish in all 16 fluid ounces of product. Express again after twenty-four hours' maceration, add the liquor to the previously obtained product and the sugar, heat in a closed vessel by means of a water-bath to 200° F., and maintain at that temperature for ten minutes. When cold, strain and add, after mixing—

Chloroform.	24 minims.
Oil of coriander	2½ "
Tincture of capsicum	½ fl. drm.
Rectified spirit	3 "

Agitate thoroughly, and, if necessary, add proof spirit to make the product measure 24 fluid ounces.—Yearbook of Phar., 1889, 527.

Elixir of Quebracho—Formula.—Leon S. Riseley suggests the following formula for an elixir of Quebracho: Fluid extract of quebracho (see formula under "Fluid Extracts"), 1 fl. oz.; magnesium carbonate, 2 drachms; mix thoroughly, then add aromatic spirit (Nat. Form.), 180 minims; tincture of vanilla, 120 minims; syrup, 1 fl. oz.; aromatic elixir (Nat. Form.(?), Rep.), sufficient to make 1 pint.—Amer. Jour. Pharm., April 1890, 171.

Blackberry Brandy—Various Formulas.—The variability of the so-called "blackberry brandy" of commerce, both in appearance and composition, is explained by the following formulas which John P. Kelly has procured from different manufacturers of that article:

1. Fluid extract of blackberry bark, 2 parts; syrup, 2 parts; whisky, 4 parts.

2. Blackberry juice and brandy, equal parts.

3. Blackberry root, cinnamon, cloves, glycerin and brandy; no proportions given.

4. Blackberry juice, syrup, spices, New England rum; no proportions given.

Four samples, procured respectively from the States of New York, New Jersey, Kentucky and Pennsylvania, were examined, with the following results:

1.	1.022	specific	gravity;	15	per cent.	(weight)	alcohol;	19	residue.
2.	1.013	"	"	29	"	"	"	17	"
3.	1.103	"	"	25	"	"	"	35	"
4.	1.033	"	"	13	"	"	"	20	"

—Amer. Jour. Pharm., Sept. 1889, 467.

Absinthe—Composition and Speculation as to Poisonous Components.—Cadéac and Albin Meunier have determined the constituents of absinthe, as ordinarily made, to be as follows: Volatile oils of anis, 6 gm.; of illicium, 4 gm.; absinthium, 2 gm.; coriander, 2 gm.; fennel, 2 gm.; menthe, 1 gm.; hyssop, 1 gm.: angelica, 1 gm.; melissa, 1 gm.; alcohol of 70 per cent., colored with the fresh leaves of dead nettle [*ortie*] or parsley. The authors think that the poisonous properties of absinthe liquor are chiefly due to the oils of anis and of illicium; not that these are very toxic in the ordinary sense, but that they constitute a poison against the nervous centres, diminish muscular energy, paralyze the will, cause vertigo, trembling, stupor, etc., and at times epileptiform convulsions. The authors think that the wormwood contained in the liquor is nearly innocuous, and that the formula would be sufficiently amended by largely decreasing the amounts of illicium and anis contained in it.—Amer. Jour. Pharm., Dec. 1889, 612; from Proc. Acad. de Méd., Sept. 10, 1889.

EMPLASTRA.

New Plasters—Suitable Vehicles, etc.—Cavailles observes that plasters containing anthrarobin, chrysarobin and pyrogallic acid cannot well be made with a basis of lead. He obtains good preparations with oleate of alumina for such plasters as are not intended to irritate, as, for instance, those of oxide of zinc, boracic acid, etc. For salicylic acid, creasote, pyrogallic acid, chrysarobin, anthrarobin, etc., a solution of caoutchouc in benzol is used. For example: Lanolin, 60 gm.; benzinic solution of caoutchouc, 30 gm.; anthrarobin, 10 gm. Pulverize the anthrarobin well and incorporate it with the lanolin; melt with gentle heat, add the benzinic solution, and agitate until complete evaporation of the benzol. The formula is suitable for other plasters.—Amer. Jour. Pharm., Aug. 1889, 415–416; from J. de Ph. et de Chim.

Caoutchouc Plasters — Various Combinations.—Schneegans and Corneille prepare various caoutchouc plasters from a mass consisting of lanolin, benzoinated tallow, caoutchouc and dammar resin, the last two ingredients being employed merely in sufficient quantity to insure adhesiveness. The addition of a little glycerin prevents the plaster from becoming dry and brittle. Sheet caoutchouc is agitated with and macerated in 5 times its weight of benzol; at first it swells, and in about 3 or 4 days it dissolves. Special formulas are given by the authors for the following plasters:

Plaster of Zinc oxide, (20 per cent.)—Dammar, 15; tallow, 25; lanolin, 15; caoutchouc, 5; glycerin, 20; zinc oxide, 20 parts. Melt the resin, add the tallow and strain through gauze; then add the lanolin and the caoutchouc solution, cautiously evaporate the benzol and add the zinc oxide previously rubbed up with the glycerin; lastly stir until a homogeneous mixture is obtained. On spreading it upon muslin, the mass should not be too warm. One kilo of mass will suffice for 25 to 30 meters of plaster 20 cm. in width, and this may be spread in 1 or 1½ hours. The plaster is finally exposed to the air for 2 or 3 days, covered with gauze and preserved in paper.

Plaster of Iodoform.—Dammar, 15; tallow, 30; lanolin, 20; caoutchouc, 5; glycerin, 10; iodoform, 20 parts. Proceed as before, and add the iodoform, well triturated with the glycerin, to the nearly cooled mass. Keep the plaster in a tin box.

Plaster of Mercury.—Dammar, 20; tallow, 34; lanolin, 20; caoutchouc, 6; mercury, 20 parts. Rub the mercury with the lanolin until no globules remain visible, and add this to the nearly cool mixture of the other ingredients, prepared as above stated.—Amer. Jour. Phar., April 1890, 173–174; from Jour. d. Pharm. v. Elsass-Lothr., Feb. 1890, 33.

Rubber Plaster Masses—Formulas.—H. Hager gives formulas for adhesive plaster masses, which are very similar to the above, as follows:

Massa Emplastica Cummea.—10 parts rubber, in fine shreds, are added to a melted mixture of 25 parts anhydrous lanolin and 25 parts rosin, stirring with an iron spatula and heating moderately at first, afterwards to 180

-200° C., until the rubber is completely dissolved; 25 parts rosin and 10 parts dammar resin are now added, and heat is applied until a homogeneous mixture is obtained, which is poured into porcelain vessels and set aside for use.

Massa Emplastica Perchata differs from the above mass only in using gutta-percha instead of rubber. The gutta-percha is softened by kneading under hot water, drawn out into thin ribbons, and cut into shreds before adding it to the melted lanolin and rosin. The addition of 25 per cent. of these masses to the regular plaster mass will cause the plaster to adhere to the body for weeks; should the plaster contain mineral oils, 30 per cent. of the adhesive masses should be added. The anhydrous lanolin is of especial value in absorbing the moisture eliminated by the body, so maintaining the adhesive property of the plaster.—Pharm. Ztg., 1890, 108.

Emplastrum Scopolæ—Preparation.—F. Ransom proposes plaster of scopola to be made from alcoholic extract of scopola (which see) as follows: Alcoholic extract of scopola, 4 oz.; resin plaster and soap plaster of each, 8 oz. It contains nearly 0.4 per cent. of alkaloid.—Amer. Jour. Pharm., Feb. 1890; from Pharm. Jour. and Trans., Dec. 14, 1889, 466.

ENEMATA.

Enemata of Hypnone, Chloral and Sulphonal—Preparation.—P. Vigier recommends a formula for "hypnone enema," as follows: Hypnone, 10 to 20 drops; powdered gum, 3 gm.; oil of sweet almonds, 5 gm.; water, 150 gm.; for one enema. Mix the oil and gum in a mortar, add the water, and introduce the hypnone a little at a time while beating. Emulsion is perfectly effected in five minutes. The hypnone may be replaced by 1 or 2 gm. of chloral or of sulphonal.—Amer. Jour. Pharm., 1889, 416; from L'Union Phar.

EXTRACTA.

Vegetable Extracts—Preparation.—Prof. J. U. Lloyd observes that on the continent of Europe many of the vegetable extracts are made from the fresh drugs, either water or diluted alcohol being used for their extraction, and that the objection to our methods is frequently made that we extract the drug with alcohol of too great a strength, or without preliminarily soaking the dried drug in water before such extraction. He, furthermore, observes that *diluted* alcohol rapidly penetrates vegetable tissues, even when these are simply cut up; that dried drugs appear to have a more powerful endosmotic affinity for diluted alcohol than for water; but that for *strong* alcohol the reverse is the case, even if the constituents to be extracted are easily soluble in alcohol, inasmuch as strong alcohol superficially hardens the cellular tissues by abstracting water from them. It appears, therefore, advisable that before extraction the dried drug be brought approximately to its original fresh condition by moistening it with water, and the author has, in his experience, found this to be a practical advantage. He thinks, furthermore, that the greater number of vegetable drugs are preferably extracted with a diluted rather than with a strong alcoholic menstruum. In either case the powdered drug should first be moistened with water—say 3 ozs. of water to 1 lb. drug, allowed to stand 10–12 hours, then moistened with the alcoholic menstruum, and percolated in the usual way: the quantity of water used for the preliminary moistening being taken into account and compensated for by the addition of the necessary quantity of strong alcohol in the first portion of *dilute* alcoholic menstruum to be used for moistening before percolation.—Pharm. Rundschau, July 1889, 165.

Dry Extracts—A New Class of Preparations Obtained by Freezing.—Dr. Frederick Hoffmann calls attention to a new form of "dry extracts," exhibited by several Parisian manufacturers at the recent Exhibition. These extracts are characterized by their extreme light color and porosity, resembling in the latter respect the foamy condition of tannin. According to Adrian, these extracts are made by a freezing process (similar to that heretofore described in these reports—Rep.). The aqueous extractions are repeatedly subjected to freezing, the mother-liquor becoming more concentrated each time, and being finally evaporated to dryness at the lowest practicable temperature. The solid extracts of cinchona, ipecacuanha, rhatany, etc., exhibited, were in each case of lighter color than those of the powdered drug as ordinarily found in the shops.—Pharm. Rundsch., Sept. 1889, 219.

Extract Stramonium, B. P.—Preliminary Extraction of the Seed by Ether Superfluous.—Having occasion to make extract of stramonium, A. W. Gerrard extracted the stramonium seed by direct percolation with hot proof spirit, omitting the preliminary extraction with ether required by the British Pharmacopœia. The resulting extract contained very little fixed oil, and was in every respect satisfactory after washing it with a little ether. Further experiments showed the seeds to yield 23.1 per cent. of fixed oil, and 4.47 per cent. of dry extract. By his modified process 4.4 per cent. of dry extract was obtained.—Yearbook of Pharm., 1889, 371–373.

Extract of Valerian—Unfavorable Effect of Concentration in Vacuo.—Jouillard has recently examined some pills, which, though composed of extract valerian, were free from the characteristic odor of that drug. He learned that the pills had been made from an extract prepared *in vacuo.* The removal of air pressure had caused the aromatic principle to volatilize.—Amer. Jour. Pharm., Aug. 1889, 417; from Répert. de Pharm.

Extractum Scopolæ Alcoholicum—Preparation and Standardization.—F. Ransom proposes a standardized extract of scopola (see *Scopola carniolica*), to be prepared as follows:

Take of

Scopola rhizome, No. 20 powder	1 pound.
Rectified spirit	48 fluid ounces.
Distilled water,	
Sugar of milk, of each a sufficiency.	

Mix the spirit with 12 fluid ounces of distilled water, macerate the scopola in two parts of this mixture for 48 hours, agitating occasionally; then transfer to a percolator, and when the fluid ceases to pass, continue the percolation with the remainder of the diluted spirit. Afterwards subject the contents of the percolator to pressure, filter the product, mix the liquids, and evaporate over a water-bath to the consistence of a soft extract. Estimate the alkaloidal strength of this extract by the following method:

Dissolve 2 grams of the extract in about 10 c. cm. of warm distilled water acidulated with a few drops of diluted hydrochloric acid. Pour the solution into a stoppered glass separator, and add ammonia until the liquid is distinctly alkaline. Agitate for a few minutes with 16 c. cm. of chloroform, separate and again wash the aqueous liquid with 3 c. cm. of chloroform. Agitate the mixed chloroform solutions with 10 c. cm. of diluted hydrochloric acid, separate, wash with 3 c. cm. of the diluted acid, mix the acid solutions, render alkaline with ammonia, and agitate with 10 c. cm. of chloroform. After separation, wash the alkaline solution with 3 c. cm. of chloroform, mix the chloroform solutions, evaporate in a dish of known weight, and dry the residue, which should be nearly colorless, at a temperature of 200° F. (93° C.). The weight of the residue thus obtained multiplied by 50 will give the percentage of alkaloid present in the extract. Having thus ascertained the strength, warm the extract over a water-bath in a dish of known weight, and adjust by evaporation or by the addition of distilled water and sugar of milk in such proportion that the finished extract shall be of firm consistence, and shall contain two per cent. of alkaloid.—Amer. Jour. Phar., Feb. 1890; from Phar. Jour. and Trans., Dec. 14, 1889, 465.

Extract of Quebracho—Absence of Alkaloid in Commercial Specimens of Reliable Manufacture.—J. A. Wilson observes that commercial quebracho extract is said to be mixed with other astringent drugs, and palmed off as extract of quebracho, so that if the presence of the alkaloids were proved in the genuine extract, the amount in these doctored extracts would be very variable. The author determined to see whether any alkaloids could be obtained from the commercial extract, as manufactured by first-class firms. and two samples were, therefore, examined in the same manner as used for detection of glucosides and alkaloids in general. Sample No. 1 gave:

1.86 per cent. ash (0.81 soluble, 1.03 insoluble). Alkalinity of soluble equal 0.37 per cent. K_2O.

30.47 per cent. total non-volatile solids.

The total solids on extraction gave:

3.2 per cent. petroleum ether extract.
50.7 " alcoholic extract.

Fifty gms. of the extract was examined for alkaloids in the following manner:

1. Evaporation in a vacuum at 50° C.

2. Residue treated with 150 c.c. of 90 per cent. alcohol acidulated for eighteen hours.

3. Treating the residue obtained on evaporation of alcohol with six times the volume of water for twelve hours and filtering.

4. Treating the filtered liquid from 3 with immiscible solvent, petroleum ether, benzol, chloroform, etc., in the acid state.

5. The liquid, after extraction in the acid state, is rendered strongly alkaline with ammonia, and extracted as before with petroleum ether, benzol, and chloroform; the latter quite warm.

The residues obtained on evaporation and recovery of solvent were then examined by the general group reagents, and by the sulphuric acid and lead peroxide test, also by sublimation, but the author failed to detect the least trace of any alkaloid whatever.—Chem. News, Nov. 22, 1889, 251–252.

Extract of Quebracho—Preparation.— According to a suggestion of Leon S. Riseley, the extract of quebracho is made by exhausting the bark with a mixture of alcohol 9 and water 5 parts, evaporating the tincture, and incorporating glycerin 5 per cent. with the extract.—Amer. Jour. Phar., April 1890, 172.

Extract of Logwood—Detection of Sugar in the Commercial Product.—Otto Schweissinger determines sugar in commercial extract of logwood as follows: From 2 to 5 gm. of the extract are dissolved in 50 c.c. water, mixed with 10 c.c. basic lead acetate, well shaken, and, after standing for a short time, poured upon a dry filter. So much of the liquid runs through that it can be at once polarized in a tube 100 m.m. in length. Filtrates from pure extracts deflect the plane of polarization not at all or but little, certainly not to the right. The entire filtrate (25 to 30 c.c.) is mixed with so much lead chloride that the lead is precipitated as chloride and about 0.5 gm. hydrochloric acid remains in excess. The acid liquid is heated in a reflux condenser for half an hour and let cool. The crystals of lead chloride are disregarded, and the liquid is neutralized with sodium carbonate, filtered and titrated with Fehling's liquid. Two pure samples, when thus treated, showed no sugar, three suspicious ones respectively 6, 7 and 8 per cent., and a grossly adulterated sample 20 per cent.—Chem. News, July 26, 1889, 49; from Pharm. Centralhalle.

Extract of Malt—Determination of Disastatic Power.—R. A. Cripps records the following method employed by him for the determination of the diastatic power of extract of malt:

(1) Prepare a mucilage by mixing 1 gm. of potato starch or arrow-root, (dried in an oven at 212° F.) with 10 c.c. of cold water; add 100 c.c. of boiling water, and boil the whole for half an hour; allow to cool to about 100° F., and make up the measure to 100 c.c.

(2) Dissolve 5 gm. of the sample of extract of malt in water sufficient to produce 50 c.c. of solution.

(3) Dissolve 1 gm. iodine in 100 c.c. of water by the aid of .2 gm. of iodide of potassium.

50 c.c. of starch solution is introduced into a flask or bottle and kept in a water-bath at a temperature of 98° to 100° F., until it has attained that temperature, when 5 c.c. of the malt solution is added (also at 98° to 100° F.), gently shaken to mix thoroughly, and replaced in the water-bath; after five minutes and at intervals of five minutes (or less if found desirable) 4 c.c. of the liquid is poured into a test-tube containing 1 c.c. of the iodine solution. A good extract of malt will give no indication of starch or dextrin after ten, or at most fifteen minutes, while one which still gives a distinct coloration after thirty minutes should be rejected as quite unfit for use; that is, *extract of malt should completely digest its own weight of potato starch in 10–15 minutes at 98–100° F.*

The following table will indicate the importance of using one or other of these kinds of starch.

	0.5 gm.				0.1 gm.			0.05 gm.			
	5 min.	15 min.	30 min.	45 min.	5 min.	15 min.	30 min.	5 min.	10 min.	15 min.	30 min.
Arrowroot .	Done.	. . .	. . .	. . .	Done.	. . .	. . .	Bright brown.	Pale brown.	Done.[*]	. . . .
Maize . . .	Bluish.	Bluish.	Done.	. . .	Indigo.	Indigo blue.	Violet.	. . .	. . .	. . .	Clear blue.[‡]
Potato . . .	Done.	. . .	. . .	. . .	Done.	. . .	. . .	Bright brown.	Pale brown.	Done.[†]	. . . .
Rice	Bluish.	Pale bl.	Done.	. . .	Blue.	Bluish.	Pale vlt brown.	. . .	. . .	. . .	Clear violet.
Wheat . . .	Brownish Violet.	Violet brown.	Violet tint.	Very pale violet.	Brown violet.	Violet.	Purple.	. . .	. . .	. . .	Clear violet.[‡]

[*] Completed in twelve minutes.

[†] Completed in twelve and a half minutes.

[‡] These colors refer to the liquid five times diluted; the color was too deep to be seen before dilution.

The different mucilages were all prepared as described above, and quantities of mucilage representing .05, .1 and .5 gm. of each starch (dried) introduced into the bottles, the bulk of each being made up to 50 cc. with distilled water, and .5 gm. of extract of malt added to each.—Pharm. Jour. and Trans., Dec. 21, 1889, 481.

Extract of Malt with Acid Phosphates—An Incompatible Preparation.—S. E. Dougherty has made some investigations to determine whether extract of malt containing phosphates and free acid retained its diastatic power. The results proved that acid preparations of malt and phosphates are unsuitable and incompatible, their power of digesting starchy food having been nullified by the acids present. Even the tamarind flavoring appears to exert an influence detrimental to the usefulness of the compound. Such a preparation, instead of relieving, must give additional labor to the alimentary tract by having itself to be digested.—Drugg. Circ., May 1890, 101.

Malt Extract with Cod-liver Oil—Examination.—J. B. Nagelvoort has examined a number of commercial samples of malt extract with cod-liver oil by a process recommended by him and given below, with the following results:

No.	Percentage of Oil		
	Claimed.	Found.	Spec. Grav.
1,	40	35	—
2,	40	26	—
3,	12.5	7.5	1.32
4 (own make),	12.5	12	1.27

The differences between the percentage figures in the two columns are probably the consequence of an unintentionally inaccurate description. He thinks Nos. 1, 2 and 3 are erroneously reckoned by volume. The process of examination is as follows:

A—25 gm. of the preparation containing malt extract with cod-liver oil is boiled in a suitable flask with 10 times its volume of water for an hour.

B—Remove, yet warm, to a large separator and set aside in a warm place for 24 hours; the wash-waters of the flask are, of course, added to the contents of the separator.

C—The watery fluid is separated from the frothy top layer. This layer is shaken out with a large quantity (500 cc.) of boiling water, and the separator again set aside in a warm place for 24 hours. This operation is repeated until the watery fluid separates clear, which takes usually three or four days, and depends for a good deal on a sharp separation.

D—After the removal of the water, add 100 cc. of a mixture of equal quantities of ether and chloroform (this is preferable to chloroform alone, which emulsifies too easily, neither did amyl-alcohol yield good results). Agitate thoroughly, separate, collect in a tared porcelain dish, expel ether and chloroform, cool off and weigh; multiply results by 4 to obtain the percentage of the oil.

E—The oil is to be examined in regard to iodine absorption, to free and combined fatty acids, specific gravity, iodine, albumen, etc., just as a natural product—this he *considers to be as important as any assay of a crude drug.*—Amer. Jour. Phar., June 1890, 289–291.

Extract of Malt and Cod-liver Oil—Impracticable Combination.—Adrian observes that the mixture of cod-liver oil and extract of malt should not be regarded as solutions, for they are simply "commenced emulsions" to which the water has yet to be added. The author says, moreover, that the preparation does not constitute a practical mode of giving cod-liver oil, because it forms a jelly in which the taste of the oil is not disguised, while the material remains too long in the mouth. If the jelly be diluted in milk, as has been proposed, the taste is quite disagreeable, and the medicament becomes too bulky.—Amer. Jour. Pharm., April 1890, 180; from Jour. de Pharm. et de Chim., Jan. 1890.

Oleoresin of Pumpkin Seed—Preparation, etc.—Louis Augustus Minor found two samples of "oleum peponis" of the market medicinally ineffective, while an *oleoresin of pumpkin seed*, prepared as follows, ejected promptly large portions of tapeworm: The seeds were reduced to a coarse powder by triturating them in a mortar with pumice stone, exhausting with ether by maceration and percolation, and evaporating the solvent at a gentle heat. After washing the oil with some alcohol, it formed a thick liquid of a red color, had a peculiar unpleasant odor and a disagreeable rank taste. Its specific gravity at 60° F. is about 0.924. It is almost insoluble in alcohol, soluble in chloroform, ether, benzin and benzol, and does not congeal at 32° F. Strong sulphuric acid changes the color to green, then dark green, and after several hours to a dull red-brown, a blackish deposit being also formed. Strong nitric acid changes to red-brown, and after about 5 minutes causes violent effervescence, a disagreeable odor being given off, and after cooling a reddish-brown semi-solid mass is left. It may be given in doses of ½ to 1½ fluidounce, in the form of an emulsion flavored with aromatics.—Amer. Jour. Pharm., June 1890, 274–275.

EXTRACTA FLUIDA.

Fluid Extracts of the Pharmacopœia, 1880—Proper Menstrua.—William Weber has communicated a highly interesting paper, in which he discusses the importance of a proper selection of menstrua for the preparation of tinctures, and, more particularly, of fluid extracts. The author records a number of experiments made upon different drugs—aconite, arnica, orange, belladonna, brayera, buchu, calamus, calumba, chimaphilla, chirata, cimicifuga, cinchona, colchicum, conium, dogwood, cubeb, ladies-slipper, bitter-sweet, coca, eucalyptus and eupatorium—in which he points out the manner and methods by which, in his opinion, it becomes possible to decide upon suitable menstrua for pharmacopœial preparations. The paper appears to be more particularly addressed to the revisors of the Pharmacopœia, and may be profitably consulted in Amer. Drugg., June, 1890, 101–104.

Fluid Extracts—Objection to their Substitution for the Crude Drugs in

Making Tinctures.—W. H. Wearn, in response to a query of the North Carolina Pharmaceutical Association, records his objections to the substitution of fluid extracts for the crude drugs for making tinctures. He regards the fluid extracts as less stable than the crude drugs, and finds moreover that the commercial fluid extracts—as exemplified by specimens from three leading manufacturers—do not represent the amount of crude drug specified or required by the Pharmacopœia. He says: The crude drug presents its constituent elements separately encased in their respective cells, classified into tissues composed of like component cells, and the whole is encased by the epidermal tissue. Consequently no chemical action takes place between the constituent elements, because they are separated by their cell-walls of cellulose, which is unaffected by them. Protection is given to the whole by the epidermal tissue, from the outside forces. The plant, having been properly dried, is deprived of its water, thereby dormantizing its unorganized ferments, which prevents decomposition by them. Fluid extracts deteriorate faster than drugs, because they are physically weaker and unprotected naturally. The influences that cause their deterioration are exposure to air, loss of menstruum, reduction in alcoholic strength, and the like.—West. Drugg., Nov. 1889, 400; from Proc. N. C. Phar. Assoc., 1889.

B. O. Taylor, referring to the above paper, expresses his regret that Mr. Wearn should underrate the value of fluid extracts. He considers them the most satisfactory liquid preparations of drugs that we have, and that, with the exception of the "abstracts," they come nearer to uniform strength as a class than any other officinal preparations. He regards fluid extracts as far more stable preparations than tinctures, to which Mr. Wearn appears to offer no objection. Different specimens of fluid extracts of the same drug will, when properly made, vary in the amount of extractive they contain, only as the different specimens of drug from which they are made vary; and, as some specimens of a crude drug are much richer in extractive matter than other specimens of the same drug, we cannot obtain exact uniformity as to strength in extractive matter, in all fluid extracts of a kind. Whenever practicable, fluid extracts should be manufactured by the pharmacist himself, from judiciously selected crude drugs, and, if honestly made, and the drug is thoroughly exhausted, they can only vary as the drug varies. As regards the amount of extractive matter contained in fluid extracts, it is an open question whether its presence is necessary. The author considers it highly probable that in a great many cases a fluid extract contains all the active principles of a drug without containing all of its extractive matter, and in other cases is loaded down with resins, gums, etc., which are not only useless, but in many cases injurious.—Ibid., Dec. 1889, 453.

Narcotic Fluid Extracts and Tinctures—Necessity of Uniformity in Strength.—Ferdinand Lascar discusses the problem of preparing fluid extracts, tinctures, and other galenical preparations, particularly those of narcotic medicines, so that they may be uniform in strength. He records also some experiments made to determine the availability of specific gravity, amount of extractive, etc., for such determinations, but finds them untrustworthy and impracticable. The proper solution of the whole question is standardization, which he considers feasible in many cases, and which should, in his opinion, engage the careful consideration of the revisors of the Pharmacopœia.—Drugg. Cir., March 1890, 51.

Fluid Extract of Ipecacuanha—Standardization.—I. O. Braithwaite and J. C. Umney record their experiments made with a view to prepare a fluid extract of ipecac of definite alkaloidal strength. Operating with ipecacuanha root that assayed 1.32 per cent., they obtained a fluid extract which assayed 1.28 per cent. emetine. They eventually adopted 1.25 per cent. as a proper strength and propose the following method for preparing the fluid extract:

Take of

Ipecacuanha Root in No. 20 powder	10 parts.
Slaked Lime, freshly prepared	1 part.
Rectified Spirit,	a sufficiency.

The ipecacuanha is exhausted first by percolation with rectified spirit in the usual way, and the first 8½ fluid ounces of percolate are reserved. The well-drained marc is then removed from the percolator, mixed with the lime, returned to the percolator, and, after standing 24 hours, the percolation with rectified spirit is continued to final exhaustion. The spirit is recovered from the last two percolates, the residual extract is dissolved in the reserved percolate, the amount of emetine is estimated by the process given below, and the volume of fluid extract is adjusted, by the addition of rectified spirit, so that 100 fluid parts shall contain 1.25 parts by weight of emetine. The

Assay Process is a modification of Ransom's, (see Proceedings 1888, 352). It is as follows:

Twenty c.c. of the fluid extract are mixed with 40 c.c. of water, and the volatile solvent driven off by cautious evaporation on the water bath. The resulting solution is filtered, the filter washed, and precipitated with basic acetate of lead. The lead precipitate is removed by filtration, well washed, and the excess of precipitant removed by sulphuretted hydrogen, the sulphide being then filtered off. The filtrate is rendered very faintly alkaline with ammonia, and shaken with chloroform, which readily separates; the alkaloid is washed out of the chloroform in the usual way with acidulated water, and the solution titrated with Mayer's solution. The authors propose this extract for the preparation of ipecacuanha wine (which see).—Yearbook of Pharm., 1889, 390–394.

Extractum Cascaræ Sagradæ Liquidum—Proper Menstruum.—John Findlay has prepared liquid extract of cascara as follows:

1. By macerating 1 pound of the coarsely-powdered bark with 30 ounces of distilled water for 48 hours, percolating, reserving 8 ounces, continuing the percolation to exhaustion, evaporating the second percolate to 4 ounces, and mixing this, when cool, with the reserved portion and 4 ounces of rectified spirit, filtering after 24 hours, and making up to 16 fluid ounces with distilled water.

2. By macerating 1 pound of the bark with 4 fluidounces of rectified spirit and 12 fluidounces of distilled water for 48 hours, transferring to a percolator and percolating with water to exhaustion. The first 10 ounces are reserved, the exhaust percolate is evaporated to 5 ounces, and this, when cool, is added to the reserved portion, together with 1 ounce of rectified spirit. It is filtered after 24 hours, and made up to 16 fluidounces with distilled water.

3. By percolating 1 pound of the bark with menstruum composed of alcohol 6½ oz., water 3½ oz., continuing to exhaustion with menstruum of the same strength, reserving the first 10 ounces, evaporating the exhaust percolate to 4 ounces, and mixing this together with 1 ounce of alcohol with the reserved portion.

Preparation No. 1 has the s. g. 1.061, and yields 25 per cent. dry extractive; No. 2, s. g. 1.100, and 30 per cent. dry extractive; No. 3, s. g. 1.050, and 30 per cent. dry extractive. The latter is made after the American method. Preparation No. 2 was found to be most effective.—Pharm. Jour. and Trans., Dec. 21, 1889, 491.

Fluid Extract of Roasted Coffee—Preparation without Alcohol.—G. H. Chas. Klie has made a very satisfactory fluid extract of roasted coffee without alcohol by the following process, using ¼ Mocha and ¾ Java. 2 lbs. av. of the coffee, in No. 30 powder, are moistened thoroughly with 14 fl. ozs. of boiling water containing 25 per cent. of glycerin, the moistened powder is packed into a percolator, and exhausted with boiling water containing 25 per cent. of glycerin. The first 28 fl. ozs. of percolate are collected as finished fluid extract; the percolation is, however, continued with the same hot menstruum and three portions, marked 1, 2 and 3, of 2 pints each of percolate, are obtained. These may be used at once to make a fresh quantity of fluid extract of coffee, or, if it is not desirable to make a further quantity, they are concentrated by evaporation to the condition of glycerin, so that they may be preserved, and used with the necessary quantity of boiling water in a future operation. The best percolator for this purpose is one of glass or earthen ware, and this is preferably jacketed, so that the contents of the percolator may be kept hot. If of glass it should be carefully heated preliminarily, else it is liable to break on introducing the hot menstruum. With this fluid extract an elegant well-flavored syrup is readily made, and it makes an admirable cup of coffee. The fluid extract has been kept for a year without becoming mouldy.—West. Drugg., Dec. 1889, 452.

Fluid Extract of Wild Cherry—Improved Formula.—Michael J. Rourke, after making a number of experiments, recommends the following process as yielding an elegant fluid extract of wild cherry: Moisten wild cherry bark in No. 50 powder, 200 gm., with a mixture of glycerin 20 gm., syrup 60 gm., and diluted alcohol 40 gm.; pack loosely in a glass percolator and set aside for three days. Now, pack very tightly and pour enough diluted alcohol upon the material, to thoroughly saturate the powder and leave a stratum above; again macerate for three days, and then allow percolation to proceed until 200 c.cm. of liquid have been obtained. By proceeding as indicated, the virtues of the drug are exhausted, and the percolate obtained afterwards merely contains a little coloring matter and a very small quantity of bitter principle.—Amer. Jour. Pharm., April 1890, 171.

Fluid Extract of Guarana, U. S. P.—Precipitation and Prevention.—According to the experience of Robt. P. Blackburn, the officinally made fluid extract of guarana deposits a rather large precipitate within a few months. The amount of precipitate is materially decreased by using a menstruum composed of alcohol and water in the proportion of 4 to 1 measure, with sufficient glycerin added so that 2 oz. of it will be contained in a pint of the fluid extract.—Amer. Jour. Pharm., April 1890, 171.

Fluid Extract of Marrubium—Proper Menstruum.—Frederick G. Hertel, on making a fluid extract of horehound, using ten pounds of the ground herb, and diluted alcohol for extracting it, noticed that after standing about a week, a deposit of well-defined crystals separated from the finished extract. When heated on platinum foil the crystals melted, then charred, and finally volatilized without leaving any residue. They were quite soluble in chloroform, alcohol and ether, and slightly soluble in water. The principle is insoluble in benzin, is not colored by acids, does not respond to Fehling's test for sugar, nor to the alkaloidal group-reagents, and from its alcoholic solution is not precipitated by lead subacetate. The slight yellow color of the needle-shaped crystals was removed by several re-crystallizations from alcohol; they retained their slowly-developing but persistently bitter taste. The deposit from the 10 pounds of herb amounted to nearly one ounce, and the fluid extract appeared to be as bitter as before. By precipitating the fluid extract with basic lead acetate, filtering, treating with H_2S and concentrating the filtrate, more crystals were obtained. From the observations made, it is obvious that diluted alcohol is not a suitable menstruum for the preparation of the fluid extract. Using a liquid composed of 2 parts of water and 3 parts of alcohol with 5 per cent. of glycerin, the deposition of crystals commenced even before the fluid extract was finished. A menstruum prepared from 2 parts of alcohol and one of water, with 5 per cent. of glycerin, yielded a fluid extract remaining free from crystalline deposit.—Amer. Jour. Pharm., June 1890, 273–274.

Fluid Extract of Quebracho—Formula.—Leon S. Risley suggests the following formula for fluid extract of quebracho: Quebracho bark in No. 30 powder 16 oz., alcohol 9 fl. oz., water 5 fl. oz., and glycerin 2 fl. oz. Proceed by the pharmacopœial process for similar preparations.—Amer. Jour. Pharm., April 1890, 171.

Liquid Extract of Senna Pods—Preparation—A liquid extract of senna pods has recently been recommended by E. F. Salmon. It is to be prepared by double maceration, and subsequent filtration. E. Wightman Bell observes, in reference to this preparation, that prolonged heating is usually considered injurious to senna, and that the evaporation of 9 pints of liquid to 13 fl. oz. is, at any rate, tedious. An active and elegant preparation may readily be made on the lines of Dr. Symes's "extraction by pressure" process, as follows:

Take of

Senna pods	1 lb.
Rectified spirit	℥ iv.
Water	℥ xij.

Macerate 24 hours, express strongly, and add to the marc, mixing thoroughly.

Rectified spirit	℥ ij.
Water	℥ vj.

Again macerate 24 hours, express, and after some hours filter and add

Water to produce	℥ xvj.

Dose: ʒss. to ʒij.

—Chem. and Drugg., Oct. 26, 1889, 609.

Mr. C. Symes, referring to Mr. Bell's observations, observes that a process of expression should undoubtedly be adopted for making this preparation. He, however, suggests a modification of Mr. Bell's process, advising the use of a powerful screw-press for making the expressions. His suggestion is as follows:

Senna pods, slightly bruised	1 lb.
Rectified spirit	5 oz.
Distilled water	12 oz.

Press the pods well down in the containing vessel and pour on the mixed spirit and water; in twenty-four hours reverse the position of the pods and allow to stand a further period of four or five hours, subject to strong pressure; set aside the liquid in a bottle, break up the marc, and pour on them the following, previously mixed:

Glycerin	1 oz.
Liquid ammonia	20 minims.
Distilled water	19 oz.

Allow to stand four hours, press strongly, strain and evaporate the liquid so obtained, until when well mixed with the first liquor and filtered, 16 fluid ounces will be produced. The addition of one drop each of oil of caraway and essence oil of almonds, with two drops of essence of lemon, makes it really palatable. The medium adult dose is one fluid drachm.—Ibid., Nov. 9, 1889, 666.

Liquid Extract of Logwood, U. F. B. P. C.—

Take of

Unfermented logwood in No. 16 powder	20 oz.
Distilled water	6 pints.

Boil the logwood with two pints of water in a covered copper or enamelled pan for half an hour, and strain. Add two pints of water, boil for another half-hour, and again strain. Repeat the process for a third time, and having mixed the strained liquors, evaporate over a water-bath (or preferably *in vacuo*) until the product measures 1 pint. Set aside for seven days, and then decant the clear liquor by means of a syphon from any sediment that may have been deposited.—Yearbook of Pharm., 1889, 527.

Extractum Scopolæ Liquidum—Preparation.—F. Ransom proposes a standardized liquid extract of scopola to be prepared with alcohol of the same strength as is recommended by him for the alcoholic extract (which see). It is standardized by the process given for the extract, so that 100 c.c. shall contain 0.25 gram of alkaloid.—Amer. Jour. Pharm., Feb. 1890; from Pharm. Jour. and Trans., Dec. 14, 1889, 466.

Liquid Extract of Wahoo—Proper Menstruum, etc.—W. A. H. Naylor and E. M. Chaplin, on the basis of experiments, infer that while the aqueous extract of wahoo may or may not possess valuable medicinal properties, its power to act as an intestinal or hepatic stimulant resides somewhere in the resinous and free fatty acid principles, which require for their removal alcohol of a strength not much below 65 per cent. They therefore recommend the following process for a liquid extract of wahoo (euonymus):

Take of

Euonymus bark in No. 20 powder	20 ounces.
Rectified spirit Distilled water	of each a sufficient quantity.

Moisten the powder with 8 fluid ounces of a mixture of four volumes of rectified spirit and one volume of distilled water. Pack tightly in a percolator, and pour on sufficient menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop, close the lower orifice and macerate for forty-eight hours; then allow percolation to proceed, gradually adding menstruum until the euonymus is exhausted. Reserve the first 17 fluid ounces of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the liquid extract measure 1 pint.

Dose: 15 to 60 minims.—Pharm. Jour. and Trans., Dec. 14, 1889, 473–474.

GELATINÆ.

Medicinal Gelatins—A New Class of Preparations for Topical Application.—Medicinal gelatines are described in Deutsche Med. Ztg. (Nov. 4, 1889). These preparations are indicated in superficial inflammatory affections when the skin is swollen, wet and itchy. Very high temperature and profuse sweating forbid their use. For a general basis the following formula is given—the figures within parentheses being taken when a hard zinc gelatin is wanted:

℞ —Zinc oxide	15	(10)
Gelatin	15	(30)
Glycerin	25	(30)
Water	45	(30)

(1) Cerussa, iodide of lead, white precipitate, sulphur, iodoform, chrysarobin in fine powder, may be mixed in any proportion required. From 5 to 10 per cent. added to soft zinc gelatin is recommended.

(2) Carbolic and salicylic acid, resorcin, naphthol, creasote, and sulphide of potassium may be added to the hard gelatin basis in any proportion up to 10 p. c.

(3) Fats, balsams, tars, and ichthyol all make the basis softer. The proportion added is usually from 10 to 20 per cent.

(4) If we wish to combine drugs in rules two and three, then the sum of the proportions must be attended to. For example, if resorcin and salicylic acid were both ordered we should not prescribe more than 5 per cent. of each if we wish the gelatin to form a good covering.

(5) Powders may be combined in any proportions.

(6) Tannin, pyrogallol, and oxide of mercury cannot be added to the basis.

(7) Corrosive sublimate up to 3 per cent., camphor, chloral, and camphor chloral all to 2 per cent., ext. cannab. indic. from 2 to 5 per cent., may be used with soft zinc gelatin.

The different glues should be dipensed in pots, which are to be put in boiling water when the preparation is to be used. It is to be painted on the skin with a long-haired brush.—Phar. Jour. and Trans., April 5, 1890, 810; from Medical Chron., March 1890.

Gelatin Pastilles—Preparation.—T. S. Wokes makes some practical remarks on the preparation of gelatine pastilles. He uses for this purpose the base recommended in the London Throat Hospital Pharmacopœia under the name of

Glyco-Gelatin.—This is prepared as follows:

Refined gelatin	℥j.
Glycerin (by weight)	℥iiss.
Orange flower water	℥iiss.
Sol. carmine	q. s.

The gelatin is soaked in the water for two hours, then heated in a covered water-bath until dissolved, the glycerin added and stirred well together, and the whole strained through muslin. Wring out in hot water, and when sufficiently cooled the coloring is added. It is easy to make, taking (including the two hours' soaking) about two and a half hours, and possesses good keeping properties.

To convert this into pastilles cut off ℥j., melt in a small water-bath, add the medicament previously rubbed up with a few drops of glycerin, and pour into an oiled tray, and when cold divide into twenty-four pastilles. This is conveniently done with an ordinary table-knife for cutting, the sheet of pastilles being turned out upon a piece of card, on the surface of which are lines corresponding to the divisions of the gelatine sheet into 24 equal parts; or, as Wyatt recommends, a square tin mould 3 × 3 inches divided into squares by means of deeply impressed lines on the under surface may be used. If it is desirable to color the particles, the following colors may be used:

Red Color.—

Take of

Carmine	grs. 30.
Sol. ammonia	q. s.

Dissolve the carmine in ʒvj. of the ammonia, filter, and wash the filtrate with sufficient to collect ℥j. of the coloring.

Yellow Color.—

Take of

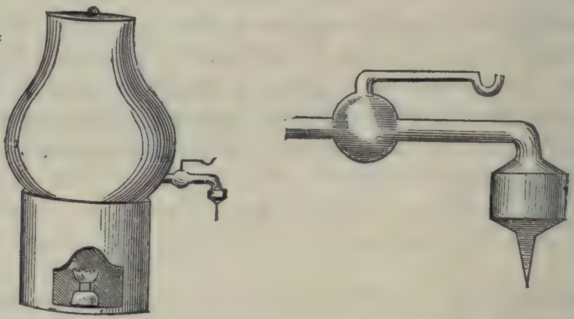
Saffron	grs. 30.
Boiling water	q. s.
S. V. R.	ʒj.

About 1 ounce of boiling water to be poured on the saffron, and infused until cold, filtered, pressing the marc, the S. V. R. added and any necessary water to make ℥j. About 5 minims of this added to an ounce of the mass gives a good tint.

The subject of flavoring is rather a wide one; many different substances may be added where suitable. Ext. glycyrrh. liq., or, better still, glycyrrhizin suggests itself as an admirable thing for covering the taste of am. ch.; the fruit juices would in many cases be admirable substitutes for the orange-flower water used in making the basis.—Pharm. Jour. and Trans., Feb. 1, 1890, 612.

Capsules—Apparatus for Filling with Liquids.—Among the apparatus shown in the Chemical Section of the recent World's Exposition at Paris was one, the invention of Mothes (who invented the gelatin capsule in 1833), which is intended for filling capsules with liquids. This filler, which is shown by Fig. 28, together with a drawing of the top in the original size, is a copper vessel, about six inches high, and rests upon a support which forms a water-bath for heating thick liquids in order to facilitate working. This apparatus is designed for retail pharmacists, with the object of facilitating the production of capsules at the dispensing counter. It admirably fulfils this object, and is a great advance upon the old way of filling the capsules from a syringe. The tap is exceedingly neat, the nozzle being long and thin for entering small openings. The lever of the tap is also novel and neat. The exhibits of capsules, while showing no superiority over those of other makes, point out the fact that capsule-making in France is as familiar a thing as making tinctures in other countries.—Chem. and Drugg., Aug. 10, 1889, 214.

FIG 28.



Apparatus for Filling Capsules.

GLYCERITA.

Glyceritum Belladonnæ—Modification of Formula.—Wm. Johnson observes that the formula for glyceritum belladonna is somewhat indefinite. He recommends the following modification of the formula of Martindale, which gives excellent results both as regards rapidity of manipulation and consistence of finished preparation. The latter is quite thick enough to please both physician and patient, and still not too thick to pour comfortably into a poison bottle.

Take of

Extract of belladonna	2 ounces.
Glycerin	2 fluid ounces.
Warm water	5 fluid drachms or a sufficiency.

Place the extract in a warm mortar, and rub it smooth with four drachms of the water gradually added; mix in the glycerin, and transfer to a bottle; rinse out the mortar with the remainder of the water, and shake the rinsings with the main portion, making the final measure four fluid ounces.—Pharm. Jour. and Trans., March 22, 1890, 769.

Glycerite of Creasote—Preparation.—Bretter proposes a glycerite of creasote, for making various preparations, such as wine, syrup, etc., to be prepared as follows: 10 p. creasote, 20 p. alcohol, 10 p. magnesium carbonate, 40 p. glycerin, and 40 p. water are rubbed together, the mixture agitated repeatedly during several days and filtered.—Ztsch. Oester. Apoth. Ver., 1890, 138.

Glycerite of Salicylic Acid—Strength Suitable for Dilution with Water.—H. Barnouvin states that on dissolving 1 gm. of salicylic acid in 50 gm. of warm glycerin, on cooling the liquid will remain clear, but on diluting it with 10 gm. of water, a precipitate of salicylic acid will be immediately produced. However, a solution of 1 part of acid in 100 parts of glycerin may be diluted with water in all proportions.—Amer. Jour. Pharm., April 1890, 172; from Bull. Gén. de Thérap., Nov. 30, 1889.

Glycerinum Saponatum—A New Ointment Base.—Glycerinum saponatum, a new ointment base, is described by Dr. Hebra as an alkaline fat obtained in the manufacture of soap, dried, and dissolved in glycerin. The solution when heated, filtered and allowed to cool, forms a yellow, transparent, and somewhat elastic mass, perfectly odorless, melting at body heat, and easily soluble in water. Dr. Hebra is so confident of the efficacy of this vehicle that he asserts its potency with salicylic acid and creasote to cure that intractable disorder, lupus. His prescription is glycerinum saponatum, 90; salicylic acid, 5; creasote, 5.—Chem. and Drugg., April 26, 1890, 551.

Glyceritum Ferri Iodidi—A Stable Preparation.—Arthur points out that glycerin has the property of preventing oxidation of ferrous salts, and even of reducing ferric salts to the ferrous state. The sweetness of glycerin also enables it to be substituted for syrup. He is of opinion that glycerites of iodide and bromide of iron might be usefully made thus: Iron 1 ounce, iodine 2 ounces, water 3 fluid ounces, glycerin 27 fluid ounces or a sufficiency. Mix 2 ounces of the water with an equal volume of glycerin in a flask; in this mixture digest the iodine and iron, heating slightly, and occasionally shaking until the froth becomes white; then filter the liquid into 26 fluid ounces of the glycerin, rinse out the flask and iron wire, and wash the filter with the remaining ounce of water, mix, and make up to 31 fluid ounces. The specific gravity should be about 1.300. This glycerite contains 4.3 grains of ferrous iodide in a fluid drachm. A similar process is proposed for the *glycerite of bromide of iron:* Iron 270 grains, bromine

540 grains, water 3 fluid ounces, glycerin 26 fluid ounces. It is possible that only a portion of the sugar might be replaced by the glycerin with quite as good a result. In the latter preparation each fluid drachm contains no less than 5 grains of bromide of iron.—Amer. Drugg., May 1890, 92.

Glycero-Gum—A Medium for Microscopic Mounting.—Charles C. Ferris finds the following preparation, which he has named "glycero-gum" a mounting medium for microscopic objects that is superior to either balsam or glycerin. It is proposed to be made by placing 2 oz. of selected gum arabic, 1½ fluid oz. each of glycerin and distilled water, and 1 grain of thymol in a wide-mouthed bottle; cork carefully, set aside in a warm place, and stir occasionally until solution is effected. The author modifies the manipulation by dissolving the gum in the fluids by the aid of heat on a water-bath, then adding the thymol, and filtering through absorbent cotton by the aid of a hot-water bath. It is important that only the clearest pieces of the best gum be selected for this purpose, otherwise the solution will not become clear enough to be satisfactory. The solution keeps well.—West. Drugg., Oct. 1889, 361.

INFUSA, ETC.

Compressed Doses of Drugs – Convenience for Making Infusions.—A Dresden firm has recently introduced a line of drugs in which small quantities of the drugs, sufficient to make a cupful of the infusion, are wrapped up separately in tin-foil, and these are put up in larger packages.—Amer. Jour. Phar., March 1890, 130; from Pharm. Centralhalle.

Concentrated Infusions and Decoctions — Preparation.—Charles D. Moffat has read an interesting paper before the Sheffield Pharm. and Chem. Soc., in which he describes those methods by which he considers it quite feasible to make all of the infusions and decoctions in concentrated and permanent form, suitable for dilution and consequently convenient for dispensing at short notice. The methods are:

1. Exhaustion with hot or cold water and evaporation.
2. Extraction by pressure.
3. Repercolation.

The author has selected three or four typical examples for each of these processes, with the view of illustrating them, which can only be briefly given here.

First Process.

Concentrated Infusion of Calumba.—Maceration of 8 ounces of the sliced root in 30 ounces of cold water for 24 hours—reserving 8 ounces, to which add 4 ounces rectified spirit—exhaustion by repeated maceration with cold water, evaporation to 8 ounces, and admixture with the reserved portion so as to make 20 ounces.

Concentrated Infusion of Quassia is prepared essentially in the same way.

Concentrated Decoction of Logwood.—The logwood is exhausted by repeated boiling with water, evaporated to 16 ounces if a pint is to be made, and the cinnamon having been made into a tincture with 4 ounces of rectified spirit, this tincture is added to make 20 ounces.

Second Process.

Concentrated Infusion of Senna.—Macerate 448 grains of powdered ginger in 4 ounces of rectified spirit, and mix 1 pound of senna leaves thoroughly with a pint of cold water. Allow this to macerate with occasional stirring for twenty-four hours, then press and set aside the product. Again mix the leaves with as much water as, if added to the first product, would yield 16 ounces, and macerate for twelve hours. Again press; mix the two liquids and wash the tincture of ginger with it, finally making up to a pint with water if necessary.

Concentrated Infusion of Buchu.—In making 1 pint, pour a pint of boiling water over ½ a pound of the bruised leaves, macerating for twenty-four hours. Then press and set aside the product; macerate again, as in the case of senna, with boiling water for twelve hours, and again press and mix the two liquids. Add 4 ounces of spirit and make 20 ounces finished preparation.

Concentrated Infusion of Rhubarb.—By this process 16 ounces of cold water is mixed with 4 ounces of the bruised root, and macerated for twenty-four hours; the remainder of the process is similar to that of senna, but it will be noticed that here a large quantity of menstruum is used in proportion to the quantity of drug. This is owing to the great power which rhubarb has of absorbing and retaining liquids.

From the 16 ounces used it is not likely that more than 8 will be recovered by pressure.

Third Process.

Concentrated Compound Infusion of Gentian.—The process of repercolation is used for the exhaustion of the gentian and orange peel, so as to obtain 16 ounces of total percolate, to which 4 ounces of tincture of lemon peel is then added..

Concentrated Infusion of Orange.—This is best made by simple repercolation—passing the percolates from 2 ounces successively through three other portions of 2 ounces each, so as to make 16 ounces of total watery percolate, to which 4 ounces of spirit are added to make 20 ounces.

Concentrated Infusion of Cascarilla.—From 2 ounces of the drug 4 ounces of tincture are made with rectified spirit by percolation. The remaining 6 ounces of drug are exhausted with water by repercolation to make 16 ounces, to which the tincture is then added.—Pharm. Jour. and Trans., Feb. 22, 1890, 682–685.

Infusum Senegæ Concentratum—Preparation by Repercolation.—A. S. Buck recommends a concentrated infusion of senega, which serves admirably for preparing the ordinary infusion of senega extemporaneously. 8 ounces of the root, ground to a uniform coarse powder, are equally distributed in 5 lamp-glass percolators and percolated in the cold water in the well-known manner of repercolation, passing, however, the entire percolate through the series from No. 1 to No. 2, etc., until 16½ fluid ounces of percolate are obtained from No. 5 percolator. This insures complete exhaustion. 3½ fluid ounces of alcohol are then added to the aqueous percolate. The slight turbidity and deposit produced need not be taken into account, since on dilution and addition of a few drops of ammonia it disappears, and a very elegant infusion is produced.—Pharm. Jour. and Trans., Dec. 21, 1889, 486–487.

Infusion of Gentian—Concentrated Preparation for Extemporaneous Dispensing.—Wm. Johnston suggests the following formula for making a concentrated infusion of gentian, to be used for making the B. P. infusion extemporaneously:

Take of

Bitter orange peel, bruised,	
Gentian root, bruised	of each, 3 ounces.
Fresh lemon peel	6 "
Rectified spirit	7½ fluid ounces.
Cold distilled water	15 ounces.
Boiling distilled water	a sufficiency.

Mix the orange peel and gentian root with the spirit and cold water, and into the mixture contained in a suitable vessel, such as a wide-mouthed jar to which a bung can be fitted, grate the lemon peel. Macerate for seven days, stirring occasionally; strain through a press bag or piece of calico, and press out the rest of the infusion. Remacerate the marc with about twelve ounces of boiling distilled water for twelve hours, and again press. Mix the liquid obtained with the previous portions, and set aside for a few days, afterwards filtering and making up with distilled water to a pint and a half.

In respect to the lemon peel, it was recommended that the yellow portion should be grated from previously weighed lemons (about six will be required) directly into the liquor, and as much of the spongy part as may contain essential oil pared off and added also, the quantity being checked by noting the loss of weight in the lemons. Such a preparation, when mixed with seven parts of distilled water, was stated to yield a liquid exactly the same in color, aroma and bitterness as the freshly-made B.P. infusion.—Yearbook of Pharm., 1889, 495–497.

Infusion of Digitalis—Modification of U. S. P. Process.—Joseph W. England, on the basis of numerous experiments, which he records, observes that instead of reducing the strength of infusion of digitalis to 7 grains to each fluid ounce, it should have been increased, if anything. But as the limit of regular saturation appears to be about 200 grains to the pint, it would be better to return to the pharmacopœial strength of 1870, *i. e.*, about 7.5 grains to the fluid ounce, or 120 grains to the pint.

The following is the formula in use by the writer:

Take of

Digitalis leaves, bruised	120 grains.
Water	14½ fluid ounces.
Alcohol	1½ " "

Macerate the digitalis leaves, previously bruised in a wedgwood mortar, for one hour, with the water, agitating occasionally. Express, filter and wash the residue placed on the filter with sufficient water to make the filtrate measure 14½ fluid ounces. To this add the alcohol. As made by this formula the infusion is a clear, transparent, amber-colored liquid, darkening in color on keeping for several days, characteristic in odor and bitter in taste. It is well, in view of the ready decomposition of such a weakly alcoholic solution, to make only such quantities as will last but a short time; or better still, to make it extemporaneously. This latter method is readily practicable with such a short period of maceration. In the preparation of infusion of digitalis there is urged the usage of the English leaf, or the German leaf selected and freed from stalks; the employment of the whole leaf, broken up as above directed, instead of a No. 20 powder; cold water maceration, instead of boiling water infusion, for reasons previously mentioned; the omission of powdered cinnamon, as retarding the solution of the digitalis principles, and as of no special value as a flavor; and, lastly, one hour's maceration as all-sufficient for the solution of the water-soluble digitalis principles.—Amer. Jour. Pharm., July 1889, 341–345.

LINIMENTA.

Linimentum Scopolæ—Preparation.—F. Ransom proposes a liniment of scopola to be made from the liquid extract of scopola (which see) as follows: Liquid extract of scopola, 24 fluid ounces; camphor, 1 oz.; rectified spirit and water, in the proportion of 4 to 1, sufficient to make 30 fluid ounces. Contains ⅕ gr. alkaloid in 100 fluid grains.—Amer. Jour. Pharm., Feb. 1890; from Pharm. Jour. and Trans., Dec. 14, 1889, 466.

Chloroform of Aconite—U. F. B. P. C.—

Take of

Aconite root,	20 oz.
Strong solution of ammonia	1½ fl. oz.
Distilled water,	1 pint.
Chloroform, a sufficient quantity.	

Bruise the aconite root, and moisten thoroughly with the strong solution of ammonia and distilled water previously mixed. Macerate for four hours, dry carefully, and reduce to No. 40 powder. Pack tightly in a percolator provided with a tap and closely-fitting cover. Macerate for twenty-four hours with 20 fluid ounces of chloroform, then pour on successive quantities of chloroform, percolating slowly until 30 fluid ounces are obtained.

Chloroform of Belladonna—U. F. B. P. C.—Prepared as chloroform of aconite *(q. v.)*, substituting belladonna root for aconite.

Chloroform of Camphor, U. F. B. P. C.—

Take of

Camphor	2 oz.
Chloroform	1 fl. oz.

Dissolve.

—Yearbook of Pharm., 1889, 526.

Oleum Cantharidini (Cantharidin Liniment)—Formula.—E. Dieterich recommends that one part of powdered cantharidin (which see) be dissolved by cautious heating in 40 parts acetone, and then 960 parts rape oil, or better olive oil, are added. The acetone prevents the crystallization of the cantharidin.—Amer. Jour. Pharm., June 1890, 293; from Pharm. Centralh., 1890, 264.

Application for Burns—Nikolsky's Preparation.—This is made according to the following formula: Tannin and alcohol, each 1 part; ether, 8 parts. Paint the burned portions two or three times daily, first washing with an antiseptic solution and sprinkling lightly with iodoform.—Amer. Jour. Pharm., Nov. 1889, 561; from Nouv. Rem., Aug. 24, 1889.

Lotio Nigra—Improved Formula.—T. C. Henderson recommends the following improved formula for black wash:

Take of

Calomel	60 grains.
Glycerin	ʒj.
Lime water	q. s.

Rub up the calomel with the glycerin in a mortar, transfer the mixture to a bottle, add 4 ounces of lime water and shake well, then add sufficient lime water to produce 1 pint. Made thus the Hg_2O is in a much finer state of sub-division, shakes up more readily, and keeps any length of time without change, while the product is more elegant in appearance than the

B. P. preparation. The author also proposes the following improvement on the formula of the London Hospital Pharmacopœia for

Lotio Plumbi cum Opio:

Take of

Solution of subacetate of lead	℥j.
Glycerin	℥j.
Tincture of opium	℥j.
Water to	1 pint.

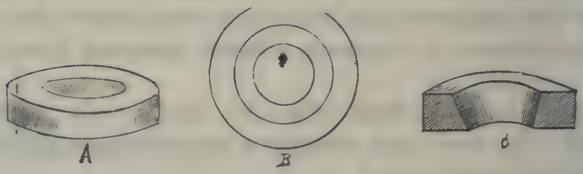
Dilute the tincture of opium with 15 or 16 ounces of water. Mix the lead and glycerin together, add these, and finally make up to 20 ounces with water. The result of this modification is that you obtain a quite transparent lotion which does not separate, and is certainly much more presentable than the former, and thus should find favor in the eyes of all who advocate elegance in dispensing.—Pharm. Jour. and Trans., Dec. 28, 1889, 517.

Caledonian Balsam.—Preparation and Use for the Treatment of Wounds, etc.—Dr. Forné calls attention to the advantages presented by a preparation that he had named

Baume Calédonien," and which consists of a solution of kauri gum in an equal weight of 90 per cent. alcohol. He states that it has been used with great success in the treatment of wounds and ulcers of all kinds. When applied to a well cleansed and dried wound it causes a very slight, but brief, sensation of burning, but after a few moments the solvent evaporates, and the resin is left as a very adherent varnish, which is not affected by friction or contact with water. The preparation can also be used advantageously for fixed bandages in the place of the soluble silicate. It was also said to be superior to tincture of benzoin for the obturation of the cavities in carious teeth. Lastly, a liniment made with equal quantities of baume calédonien and olive oil was recommended as an application to burns.—Phar. Jour. and Trans., May 31, 1890, 979; from Jour. de Phar. et de Chim., May 1, 1890, 504.

Menthol Cones—Method of Making.—"One who makes them" communicates the following concerning the making of menthol cones: "The moulds must be perfectly smooth inside, and the two parts should join exactly. An ordinary ʒij. pessary mould is sometimes used for the cones, and in the absence of anything else is quite suitable. Menthol to be used for making cones must be quite free from oil; if not, it has too low a melting point, and is unsuitable for the purpose. The menthol should be melted on a water-bath somewhat different from what is generally used for making ointments, as the usual surface exposed would favor too great vaporization of the stearoptene. It is better to place the menthol in a 1-oz. quinine bottle, and then place the bottle in hot water. Its contents soon melt, and are ready for pouring into the mould. Meanwhile the latter should have been placed near the fire, so as to acquire such a degree of warmth that it may be held comfortably in the hand. It is very important that this heating should be carefully attended to, as the temperature of the mould has much to do with the success of the operation. As soon as the cones solidify they are removed from the moulds, so as to prevent the latter from becoming cold again. Once the mould gets below the proper temperature the cones are certain to break. The next thing to do is to fix them into the holders. This is a matter which requires some care and attention. Instead of melting the base of the cone in a spirit flame, as is generally done, a better plan is as follows: Get a lead ring made, of the dimensions shown in the following figures, and place it (the smaller end downwards) in a flat evaporating dish (the lid of a 2-oz. ointment pot will do), along with some menthol. When the latter has melted, dip a cone first in the ring, then in the hot menthol, and immediately fix in the holder. There are other minor difficulties to be met with in the course of manufacture, which can only be overcome by the indispensable "mechanical ingenuity."—Chem. and Drugg., May 24, 1890, 707.

FIG. 29.



Lead Ring.

A. View from the top. B. Section. The outer and second circle show the top, and the outer and third circle the bottom. C. Cross section.

LIQUORES.

One per cent. Solutions, B. P.—Want of Accuracy.—In a former paper C. A. Macpherson criticized the formulæ given in the British Pharmacopœia for what are known as the one per cent. solutions, on the ground that they do not yield preparations in accordance with their reputed strength. The strychnine solution especially was singled out as one in which the proportional parts formula differs from that in which imperial weights and measures are used, and an amended formula was given, by which it was claimed that a true one per cent. solution could be obtained, whether the imperial weights and measures or proportional quantities were used. The author now gives formulæ, amended in conformity with these strictures, for the following officinal one per cent. solutions: *Liquor Arsenicalis, Liquor Arsenici Hydrochloricus, Liquor Arsenici et Hydrargyri Iodidi, Liquor Atropinæ Sulphatis, Liquor Morphinæ Acetatis, Liquor Morphinæ Hydrochloratis, Liquor Potassii Permanganatis, Liquor Sodii Arseniatis,* and

Liquor Strychninæ Hydrochloratis. In a further paper the author also gives formulæ for *Liquor Morphinæ Meconatis* (preferring to call it "meconatis," instead of "bimeconatis," inasmuch as "bimeconate of morphine" is a hypothetical salt), two formulæ being given, the one starting with morphine meconate, the other with morphine hydrate.—Yearbook of Pharm., 1889, 499–505 and 505–507.

Hypodermic Solutions—Suitable Preservatives—Among the preservatives that have been suggested for hypodermic solutions, H. W. Jones recommends salicylic acid, thymol and chloroform, the medicinal agent being dissolved in a water prepared from these, made of the following strengths:

Salicylic water (made in the cold by saturation and filtered).
Thymol water (1 grain rubbed down with 4 oz. of water).
Chloroform water (B. P. strength).

Salicylic Water.—This cannot be used for making morphine injection, as the writer found the solution soon became charged with a crystalline deposit. On the other hand, it was found to be, after comparative trials with other substances, the best agent for eserine, and the sulphate dissolved in salicylic water remains practically unchanged, the usual coloration scarcely appearing. Salicylate of eserine is well known as a stable salt, and for injections for the human subject it is sufficiently soluble (solubility 1 in 140) to allow of its use; but, as eserine is very largely employed by veterinary practitioners, and as the salicylate is not sufficiently soluble to allow of a strength of 1 in 80, or even stronger, it is worth bearing in mind how well salicylated water acts with the alkaloid in question in the form of sulphate, which is a most soluble salt and the one most generally met with.

Thymol Water.—This is a good preservative for ergotine, especially if the acid phosphates of potash and lime be first removed by neutralizing with ammonia, as suggested by Mr. Gerrard. It also answers very well for other substances.

Chloroform Water.—This is possibly the simplest and best of all preservatives, and answers equally well for all kinds of injections, and for making a permanent solution of morphine leaves nothing to be desired. The color does not change, or only changes very slightly on keeping, and no deposit forms. In case of apomorphine injection, the author recommends that the water be faintly acidulated with dilute hydrochloric acid.

Strength of Injections.—There appears to be no rule whatever. In case the strength is not specified, it is convenient to put the maximum dose in each 10 minims and to label accordingly. When ordered of a definite *percentage*, grain measures should be used, as a minim of water is not quite a grain.—Chem. and Drugg., June 21, 1890, 833–834.

Antiseptic Solution—Formula for Midwives.—Laborde proposes the following formula for an antiseptic solution, as being safer than Budin's

"Antiseptic powders for midwives" (which see), and equal in antiseptic power: Bichloride of mercury, 25 cgm.; chloride of sodium, 1 gm.; sulphate of copper, 1 gm.; tartaric acid, 50 cgm.; "soluble blue," 1 cgm.; distilled water, 10 gm.; glycerin, 10 gm.; in using, add 1 litre of water. This was proposed as a substitute for Budin's "antiseptic powders." The object of adding the sulphate of copper is that it would act as an emetic.—Amer. Jour. Pharm., June 1890, 299; from Répert. de Phar., March 10, 1890.

Liquor Sodii Carbolatis, N. F.—Precaution Respecting its Synonym "Phénol Sodique."—Geo. M. Beringer calls attention to the fact that the solution of carbolate of sodium of the National Formulary, the formula for which is based upon a preparation of the Germ. Pharm., is a very different preparation from the proprietary preparation known as

Phénol Sodique, and that therefore it is unfortunate that the name "phénol sodique" should have been given in the National Formulary as a synonym. The National Formulary preparation contains 50 per cent. of crystallized carbolic acid, held in aqueous solution by the addition of 4 per cent. of soda, while "phénol sodique" appears to be simply a sodic solution of coal tar, and a very much weaker preparation. The author says that the following formula will yield a preparation very similar to the proprietary "phénol sodique":

Take of

Coal tar	2 troy ounces.
Soda	120 grains.

Water, sufficient to make one pint.

Dissolve the soda in 4 fluid ounces of water and warm, add the coal tar, and thoroughly agitate the mixture for a few minutes. Then add the remainder of the water, and set aside in a covered vessel in a warm place, frequently agitating for 7 days. Decant the aqueous solution, and filter through a moistened filter, washing the residue with sufficient water to make the finished product measure one pint.—Amer. Jour. Pharm., April 1890, 168–170.

Liquor Picis Compositus—Modification of the B. P. C. Formula.—H. Collier recommends resin soap (which see under "Sapones") for making liq. picis comp. (B. P. C. formula), in lieu of tincture of quillaya, as follows:

Resin soap	2 ozs.
Rectified spirit	1 pint.

Dissolve the soap in the spirit by means of a gentle heat and then add—

Prepared coal tar	4 ozs.

Digest at a temperature of 120° F. for two days, allow to become cold, and decant or filter. This solution poured into water forms a perfect emulsion, which does not separate either upon dilution or standing.—Phar. Jour. and Trans., March 15, 1890, 752.

Solution of Picric Acid—Preparation and Use.—Dr. Calvelli proposes the following solution of picric acid, which is said to have been successfully used as a paint in erysipelas, lymphangitis and dry eczema: Picric acid, 1.50 gm.; distilled water, 250 gm.; dissolve; for external use. The application is said to have the property of reducing swellings and rapidly dispersing the heat which accompanies them.—Amer. Jour. Pharm., Sept. 1889, 473; from Monit. thérap.

Solution of Citrate of Magnesium—Modification of Formula.—Luther F. Stevens advocates the use of citric acid and magnesium carbonate in such proportions that the finished solution of magnesium citrate shall contain the hydro or acid citrate, or sometimes called bi-basic citrate, stated thus: $MgHC_6H_5O_7=214$ when anhydrous, holding still one basic hydrogen which gives it its name and also its medicinal activity, this and one basic Mg attached to the citrate group, minus the water of crystallization contained in the citric acid, and two replaceable hydrogens displaced by dyad Mg.

In a molecular statement, officinal magnesium carbonate aggregates to the rating 484, this bearing 5 Mg., which require 5 citrate molecules, one being contained in each 210 of citrate acid.

$4(MgCO_3)Mg(OH)_2 5H_2O=484+5(H_3C_6H_5O_7H_2O)=1050=5MgHC_6$-$H_5O_7=1070$ (when not crystallized) $+4CO_2=176+16H_2O=288$ ($10H_2O$ from water of crystallization in the materials, and $6H_2O$ from 6 free O and 12 free H, consequent from the decomposition). Also this salt will always form when citric acid is in excess of above proportion, leaving some free acid, while predominance of Mg, in whatever form held, will produce more or less of the neutral or sesqui or tri-basic salt, $3Mg2C_6H_5O_7=450$ rated as anhydrous, or 630 when crystallized. For instance, a solution made containing 23.37 of anhydrous acid salt, to which 10.47 Mg. Carb. (officinal U. S. P.) is added, will in a few days bring the acid salt to 25 of sesqui salt.

The present United States Pharmacopœia formula produces both of these salts—the sesqui in preponderance—to the waste of good chemicals and great loss in therapeutic effect; while if the 200 grains of carbonate were worked up into this acid salt the result would be 442 grains (anhydrous)—much too great a dose for the purposes and cases in which this inimitable medicament is used.

The materials in grains for producing solution of *hydro*-citrate of magnesium, according to the author's views, are given by him as follows:

	One bottle.	Four bottles.	Twelve bottles.
Carbonate magnesium	121.	484	1452
Acid for the reaction	262.5	1050	3150
" Potassium salt	21.	84	252
Acid in total	283.5	1134	3402
Bicarbonate of potassium	30	120	360

Salts and other products in the finished and bottled lots, stated in grains:

Hydrocitrate of magnesium	267.5	1070.	3210.
Citrate of potassium	30.6	122.4	367.2
Gas as CO_2	13.2	52.8	158.4

For the larger quantity dissolve the carbonate and the acid, each either in fragments or powder, and lemon oil 2 minims or q. s., in a large bottle, with 26 fluidounces of water; filter upon 1 pint of syrup, rinse the filter lightly, and bring to 48 fluidounces (allowing for 5 fluidounces space taken up by the products of decomposition), giving 4 fluidounces of sweetened solution for each bottle; fill with filtered water, add 30 grains bicarbonate of potassium, and immediately stopper tightly.

Regarding the magnesium carbonate, the author observes that there is occasionally a variation in that obtainable in the market; hence he gives the following test for determining its suitability for preparing the solution:

In a test tube or small bottle dissolve 14.5 grains citric acid and 10 grains carbonate of magnesium in powder with 1 fluidounce of water; allow the solution to stand until clear and for escape of CO_2. The liquid should now be neutral to good test-paper; in case it remains acid, then the carbonate is lacking in magnesium, and small portions are to be added gradually until saturation is produced.

Each 1 grain added indicating a loss of 10 per cent., $\frac{1}{10}$ grain = 1 per cent., and in similar ratio, keeping accurate account of the amounts used. The figures are derived from the following table:

Carbonate.	Acid.	Neutral Salt, anhydrous.	Crystallized.
100.	145.	155.	217.
10.	14.5	15.5	21.7
1.	1.45	1.55	2.17

In very damp weather, powdered carbonate will absorb moisture from the air and materially increase in weight; so, in case of suspicion, dry the sample before testing.—Amer. Drugg., Dec. 1889, 226–227.

Potio Rivière (*Neutral Mixture*)—*Quick Method of Preparation.*—For the quick preparation of the neutral mixture of the "Codex," Egmounet and Kauffeisen advise that two syrups be kept on hand, made as follows: No. 1. Citric acid, 43 gm.; distilled water, 120 gm.; sugar, 180 gm.; extract of lemon, 6 gm. No. 2. Bi-carbonate of potassium, 30 gm.; bicarbonate of sodium, 8.40 gm.; distilled water, 120 gm.; sugar, 180 gm. The syrups keep well, No. 1 being too acid and No. 2 being too alkaline to give rise to fermentation. To prepare the Rivière potion of the Codex, 17 gm. of each of these syrups are added to 58 gm. of water.—Amer. Jour. Pharm., Sept. 1889, 472; from Rép. de Pharm.

Fowler's Solution—Oxidation of the Arsenious Acid by Age.—In the course of some investigations, G. Kassner noticed that an alkaline solution of arsenious acid, when tested by volumetric solution of iodine from time to time, showed deterioration; this he accounted for by assuming atmospheric oxidation (change of arsenite into arsenate), and by experiment proved that the full amount of arsenic was present, but for the above method of estimation required previous reduction of the arsenate to arsenite by use of sulphurous acid. A carefully titrated one per cent. solution kept for eight weeks indicated 0.96 per cent., but by previous reduction with sulphurous acid the full percentage was again found. Kassner thinks this oxidation accelerated by an excess of alkali.—Pharm. Ztg., 1889, 549.

Lime Water—Proper Preparation, etc.—T. A. Ellwood says that by adding lime to water, small quantities at a time, and keeping a low temperature, a supersaturated solution may be made containing 20 grains in the pint, which is double the officinal strength. It is a common custom in making lime water to simply add an indefinite amount of slaked lime to a bottle containing *ordinary* water, and then standing on one side until required for use, which perhaps may not be for several weeks. Such a method is very erroneous. First, ascertain whether the lime is free from chlorides by washing and testing washings with argentic nitrate; remembering also that the Pharmacopœia directs that slaked lime should be recently prepared. 2d. Add the slaked lime to *distilled* water in definite proportions (1 to 100), and shake thoroughly for two or three minutes. 3d. Adhere to directions, and decant or syphon after twenty-four hours, for the solution rather than improving will deteriorate by keeping. Lime water should not be kept, as is very frequently the case, in the ordinary stoppered white rounds of the shop, as with the other alkalies it possesses a considerable solvent power for lead. It must be in bottles free from lead and in a cool place, and when, owing to absorption of carbonic acid, it is observed to deposit on the sides, it should be tested and only used providing it is equal to the required standard.—Pharm. Jour. and Trans., Nov. 23, 1889, 408.

Liquor Ferri Chloridi—Examination of Commercial Specimens.—Robt. W. Morris prepared solution of ferric chloride for the purpose of comparison with commercial specimens. His preparation contained a trace of nitric acid, had the specific gravity 1.435, and yielded 1.98 gm. of solid residue on evaporation of 10 gm. of the solution. With one exception, five commercial specimens also contained a little nitric acid, and in respect to specific gravity and residue he records the following results:

Specific gravity	1.392	1.421	1.414	1.417	1.406
Solid residue from 10 gm.	1.79	1.90	1.89	1.91	1.88

—Amer. Jour. Pharm., April 1890, 170.

Ferrum Dialysatum—Concentration by Freezing.—Dialyzed iron is obtained by dialysis of such dilution that it requires concentration to be of use in medicine; Hager concentrates by evaporation at a temperature not exceeding 60° to prevent the coagulation of ferric hydrate. Kranzfeld attempted to make this preparation by using very concentrated solutions of ferric chloride and ammonia, but here, also, the finished product was too dilute. Working during the cold weather, the idea of concentrating the solution by freezing suggested itself, and was practically carried out by exposing the weak dialyzed preparation over night in funnels closed with corks or rubber tubing with clamp. The next morning the fluid portion was allowed to drain off from the ice, and the process repeated until of the desired strength. It was noticed that every freezing raised the amount of ferric hydrate one per cent. A 5 per cent. solution should have the specific gravity 1.046.—Pharm. Ztschr. f. Russl. 1889, 373.

MELLITA.

Mel Rosæ—Improved Formula.—E. Daenen states that by the following method he obtains a bright rose-colored, transparent, and delightfully odorous preparation: Infuse 100 grammes of bruised red-rose petals with 400 c.c. boiling distilled water for six hours. Strain, again infuse for six hours in 200 c. c. of boiling distilled water, and repeat, if necessary, with another 200 c.c. Mix the infusions, and evaporate to 170 grammes, filter, and in the filtrate dissolve 500 grammes of clarified honey, and 330 grammes of white sugar.—Chem. and Drugg., March 15, 1890, 347.

MISTURÆ.

Emulsions—Preparation with Resin Soap.—H. Collier recommends resin soap (which see under "Sapones") as an emulsifying agent for fixed and volatile oils, balsams, and in fact for all substances for which gum arabic or tincture of quillaya has heretofore been recommended to secure a permanent mixture or emulsion. For a fluid ounce of *fixed oil*, 10 grains of soap in 1 fluid ounce of water will answer, a perfect emulsion being formed by simply shaking the solution and oil together. ℥ij of *volatile oil*, 10 grains of soap, and water sufficient for 3 fluid ounces, produces a good emulsion in the same way. A good *thymol* mixture is obtained by dissolving 18 grains of thymol and 10 grains of resin soap in 3 fluid drachms of rectified spirit, and shaking this with sufficient water to make 3 fluid ounces. The addition of 5 grains of the soap to 1 drachm of spirits of camphor permits the dilution of the latter with water to any extent, a perfect mixture being maintained. Copaiva requires 10 grains of soap in 1 fluid ounce of water for each fluid drachm.—Pharm. Jour. and Trans., March 15, 1890, 751, 752.

Emulsion of Cod-liver Oil—Process.—Mr. Herbert Graham gives the method by which he believes cod-liver oil emulsion may be most satisfactorily made. It is as follows: Let three drachms of the finest white powdered tragacanth be rubbed up in a large mortar with three ounces of glycerin; to this add as much boiling water as will convert it into a thick transparent jelly, from eight to ten ounces probably being required. After cooling add the cod-liver oil, which should first be mixed either with plain water or lime-water, in the proportion of one of the latter to three of the oil; or, if the emulsion is intended to contain the hypophosphites of lime or soda, let these be added to the plain water previous to mixing with the oil, and then let this primary emulsion be gradually added to the mucilage of tragacanth with constant stirring. In the process of mixing, the emulsion not only creams, but also thickens up to a certain point; individual taste must settle the extent to which the mixture may be carried. He found the 3 drachms of tragacanth to emulsify from fifty to eighty ounces of what he calls the primary emulsion, the former quantity being very thick and not easily poured from the mortar, the latter quantity flowing more freely and forming what he considers the better emulsion. In mixing the oil with the mucilage of tragacanth, care must be taken not to add it too hurriedly, else it will not emulsify; the mixture will simply break up into a clotted mass, and no amount of labor, apparently, will bring it back to the emulsified form. Under these circumstances, the better way is at once to begin again with a small quantity of fresh mucilage, to which the clotted mass should be carefully added by degrees.—Amer. Jour. Phar., April 1890, 184–186; from Med. News, March 15, 1890, 283.

Cremor Morrhuæ—A New Class of Cod-liver Oil Emulsions.—"Pharmakos" calls attention to *Cremor Morrhuæ*, a modified form of cod-liver oil emulsion which may serve as a basis for making quite a variety of preparations, such as *Cremor morrhuæ pancreat.*, with or without sodium hypophosphite; *Cremor morrhuæ cum sod. et calc. hypophos.; Cremor phosphorat.; Cremor eucalypti; Cremor terebeni*, etc. He gives the following formulas:

CREMOR MORRHUÆ.

Cod-liver oil	6 fl. oz.
The yolk of one egg.	
Tragacanth, in powder	10 grains.
Elixir of saccharin	30 minims.
Simple tincture of benzoin	45 "
Spirit of chloroform	3 fl. drachms.
Flavoring oils	12 minims.
Distilled water, sufficient to produce	12 fl. oz.

Measure 4 fluid ounces of the distilled water, place the tragacanth in powder in a dry mortar, and triturate with a little of the cod-liver oil; then add the yolk of egg and stir briskly, adding water as the mixture thickens. When of a suitable consistency, add the remainder of the oil and water alternately, with constant stirring, avoiding frothing. Transfer to a pint bottle, add the elixir of saccharin, tincture of benzoin, spirit of chloroform, and flavoring oils, previously mixed; shake well, and add distilled water, if necessary, to make the product measure 12 fluid ounces.

CREMOR MORRHUÆ PANCREATICUS.

Cremor morrhuæ	12 fl. oz.
Pancreatin	30 grains.
Bicarbonate of soda	150 "

Mix the pancreatin and the bicarbonate of soda in the water before adding it to the emulsion. If hypophosphite of soda be desired, it may also be added at the same time in the proportion of 4 grains to each ounce of the finished "cream."

CREMOR MORRHUÆ CUM SODII ET CALCII HYPOPHOSPHIT.

Cremor morrhuæ	12 fl. oz.
Hypophosphite of soda	48 grains.
Hypophosphite of lime	48 "

Dissolve the hypophosphites in the water, and proceed as before.

CREMOR PHOSPHORATUS.

Cremor morrhuæ	12 fl. oz.
Ol. phosphorât. (B. P.)	29 minims.

Add the phosphorized oil to the cod-liver oil before emulsifying the latter.

CREMOR EUCALYPTI.

Cremor morrhuæ	12 fl. oz.
Olei eucalypti	2 fl. drachms.

Dissolve the oil of eucalyptus in the spirit of chloroform before adding to the emulsion.

CREMOR TEREBENI.

Cremor morrhuæ	12 fl. oz.
Terebeni	2 fl. drachms.

Add the terebene immediately after the yolk of egg and emulsify.

Cremor terebinthinæ may be made in a similar manner, should such an unpalatable medicine be desired in that form, and any of the essential oils can be incorporated with very little trouble by following the directions given in one or other of the above formulæ.—Chem. and Drugg., Nov. 2 1889, 625–626.

Emulsion of Balsam of Tolu—Formula.—P. Vigier proposes the following formula for a Tolu mixture: Balsam of tolu, 5 gm.; gum arabic (pulv.), 10 gm.; orange-flower water, 10 gm.; syrup of lauro-cerasus, 30 gm.; water, 100 gm. The balsam is first melted with 10 gm. of 80 per cent. alcohol.—Amer. Jour. Pharm., Nov. 1889, 559; from Bull. Soc. de Pharm. de Paris, July 3, 1889.

Emulsion of Salol—Formula.—Jouisse proposes the following: Salol, 4 gm.; gum arabic, 4 gm.; gum tragacanth, 20 cgm.; tincture of tolu, 10 gm.; simple syrup, or syrup of tolu, 30 gm.; distilled water, q. s.; the simple syrup may be replaced by aromatic syrups. The tincture of tolu should be first mixed with the water, and, after partial precipitation, passed through a cloth filter. The author adds sufficient water to give 50 cgm. of salol to a tablespoonful. Four to six tablespoonfuls of the emulsion may be given daily, and the number gradually increased to eight. He thinks that in cancer and ulceration of the stomach, the use of this emulsion will make the use of Faucher's tube and "washing-out solutions" unnecessary. —Amer. Jour. Pharm., June 1890, 299; from Nouv. Rem., April 8, 1890.

Guaiacum Mixture—Value as an Emmenagogue.—Dr. Ménière uses the following mixture as an emmenagogue: Res. guaiac, 250 gm.; carbonate of sodium, 12 gm.; pimenta, 60 gm.; alcohol of 60 per cent., 100 gm.; macerate for eight days in a dark, cool place, filter, and add spirit of ammonia, 4 gm.; volatile oil of mint, 1 gm. Keep in yellow bottles perfectly sealed. The dose is one teaspoonful in good wine three times a day, before eating. It is said to have a more reliable action than the other emmenagogues in use.—Amer. Jour. Pharm., Jan. 1890, 20; from Rev. Méd.-Chir. des Mal des Femmes, 1889.

Iodine-phenol Mixture—A Remedy for Whooping Cough—Dr. Rothe prescribes iodine-phenol as a remedy for whooping cough in the following mixture: Acid. carbol., spir. vini, āā 1.0; tinct. iodi, gtt. x; tinct. belladon., 2.0; aq. menth. pip., 50.0; syr. opiat., 10.0. Children from two to twelve years old receive a teaspoonful every two hours, the treatment being continued for one week. This medicine, like antipyrine, shortens the attacks.—Oesterr. Zeitschr. f. Pharm., 1889, 285; from Wr. Med. Klin. Wochenschr.

Exalgin Mixture—Preparation.—According to Jouisse an agreeable and unalterable preparation of exalgin may be made as follows: Exalgin, 2 gm.; tr. aurant. cort., 5 gm.; syr. aurant. flor., 30 gm.; aq. dest., 120 gm. The exalgin should be dissolved in the tincture and the syrup added; afterwards the water. A tablespoonful contains 20 cgm. of exalgin.—Amer. Jour. Pharm., Aug. 1889, 417; from Nouv. Rem., July 8, 1889.

Butylchloral Mixture—Useful Formula.—The "Monit. Thérap." for May gives the following formula as the one prescribed by Dr. Liebreich for neuralgia of the trigemini. The preparation seems to be regarded as a specific for this condition: Butylchloral, 3 to 5 gm.; rectified spirit, 10 gm.; glycerin, 20 gm.; distilled water, 120 gm.; mix; dose, 2 to 4 tablespoonfuls.—Amer. Jour. Pharm., Sept. 1889, 473.

Mixture of Cocaine and Iron—Formula and Value in Angina.—Dr. Luton gives the following formula for a cocaine and iron mixture: Water, sweetened with saccharin, 125 gm.; liq. perchloride of iron, 2 gm.; hydrochlorate of cocaine, 25 cgm.; dose for adults, a tablespoonful every two hours. For infants, the amount of cocaine is reduced to 10 cgm., the dose being one dessertspoonful. With this, ice should be given internally. Dr. Luton says that the use of this mixture makes the tearing away of false membrane, cauterization, etc., unnecessary. He adds that he has not for a long time had in his practice a case of death from angina. He had previously claimed for cocaine the power of aborting variola and varioloid—if used in the beginning of the attacks.—Amer. Jour. Pharm., March 1890, 133; from Répert. de Pharm., Jan. 10.

Mixture for Epilepsy—Brown-Sequard's Formula.—The following formula for Brown-Sequard's mixture for epilepsy is given in Amer. Drugg. (March 1890, 56):

Sodium Bromide	180 gr.
Potassium Bromide	180 "
Ammonium Bromide	180 "
Potassium Iodide	90 "
Ammonium Iodide	90 "
Ammonium Carbonate	60 "
Tincture of Calumba	1½ fl oz.
Water, enough to make	8 " "

Dose 1½ drachms before meals, and 3 drams at bedtime.

MUCILAGINES.

Mucilage of Gum Arabic—Preparation in a Clear and Permanent Condition.—H. Helbing recommends the following method whereby a clear and permanent mucilage of gum arabic is uniformly secured. He says: It is necessary that a glass-stoppered bottle should be used, of such a capacity that the gum and water, when introduced in the proper proportion, shall quite fill it, so that when the stopper is *in situ* (not being so placed until adhering air-bubbles have been removed from the gum by gentle gyration of the vessel) all air shall be completely excluded. It is naturally somewhat difficult to hit the right quantities of gum and water to use in order to fulfil this condition at the first trial; but when they have been once determined by experiment, the figures are entered in the note book and used as guides in all subsequent operations. By avoiding contact of the mixture with the air, in the manner described, and by conducting the solution at the lowest possible temperature, all the possible precautions against premature decomposition have been taken. It only remains to allow solution to take place. But this is not most rapidly effected by merely allowing the bottle to stand on the counter and giving it an occasional shake. Under such conditions the gum forms a semi-solid, homogeneous mass at the bottom of the water, which no amount of shaking will disturb. Of course, the glass rod must not be called into requisition, primarily because it cannot be introduced into the full bottle without displacing a portion of the contents, and further, because by opening the vessel in this way we should stultify all our previous precautions to prevent the access of air. The best way to proceed is first to shake together the gum and water, having secured the stopper with string, and then allow the bottle to rest on one side. After a time it is taken up and inverted—*i. e.*, is allowed to stand on the stopper, supported in any convenient manner. As there is no air space in the bottle, no portion of the gum is out of contact with the water when the bottle is turned upside down—an important factor. The gum, therefore, gradually falls, by virtue of gravity, in the form of "strings" through the water, and is quickly dissolved. A repetition of the inversion two or three times will be sufficient to perfect solution in much less time than could be possibly effected by the common method of stirring occasionally, with a glass rod or a pestle, the mixture of gum and water contained in an open dish or mortar. The last operation is straining. This should be done by means of fine flannel, not previously moistened with water, as is generally supposed to be advisable. This material will be found to give a brighter solution with no more trouble than muslin (the meshes of which soon become blocked with impurities and dried gum); and if the finished product is filled into small bottles, and securely corked, it will be found to keep well for an almost indefinite time, at least as long as will be required in any average pharmacy.—Amer. Drugg., June 1890, 114; from Brit. and Col. Drugg.

PILULÆ.

Pill Coating—Formula for Gelatin Solution.—Isaac Hislop has communicated a paper on pill coating, in which he discusses the various methods emplyed for coating pills. He also gives the following formula for making a suitable solution of gelatin coating:

Take of

Gelatin	1 ounce.
Glycerin	½ ounce.
Water	8 ounces.

Dissolve the gelatin by means of a water bath, and when ready remove the apparatus a little distance from the heat. The pills are stuck on the ends of needles, dipped in this solution and rotated several times in the fingers, and finally stuck in putty to dry.—Pharm. Jour. and Trans., Dec. 28, 1889, 516–517.

Keratin-Coated Pills—Preparation of Solutions.—The following practical observations respecting keratin-coated pills are given in "Merck's Bulletin": It matters not what medicaments are used in the pills, provided they be worked up, and maintained sufficiently dry to keep their contents from mingling with or injuring the keratin coating. The pills, therefore, must not only contain no appreciable moisture, but, also, no hygroscopic susbtances (such as most vegetable excipients); for evaporation in the one case might cause the pills to shrink, and absorption of moisture in the other might make them swell—thus, in either case, destroying the continuity of the keratin coating, and thereby foiling its purpose. The body of the pill-mass may consist of a mixture, by fusion, of 1 part yellow wax, with 10 parts tallow or cacao butter. Kaolin, bole, or charcoal powder, may be employed as excipients.

The pills, when made from a mass prepared on the above principle and duly medicated, are, according to Dr. Bernhard Fischer, to be immersed in melted cacao butter for a moment, and then rolled in graphite powder to smooth them; then they are coated with keratin by rolling them in a solution thereof until the solution is evaporated, repeating this process (perhaps as many as ten or twelve times) until the coating is thick enough. The sufficiency of the coating may be easily determined by having a few trial pills, with say ¾ grain of calcium sulphide in each, along with the lot to be coated, and having these of different size from the others, so as to distinguish them. If one of these calcium-sulphide pills be taken, and no eructation of sulphuretted hydrogen take place within a few hours thereafter, it may safely be assumed that the coating is sufficient.

In preparing the pill-mass, fatty medicaments may be united with melted wax, or a cerate; while aqueous infusions or liquid extracts may be thickened up with acacia or tragacanth powder, and, if need be, with some vegetable or mineral powder as little apt to swell in water as can be selected. A cerate may be added, then, if it be compatible and miscible with the rest of the mass.

The solution of keratin for pill-coating is made by either of the following methods:

1. Ammoniacal solution: 7 parts keratin; digest (warming, if necessary) in a mixture of 50 parts 10 per cent. ammonia water and 50 parts 60 per cent. alcohol.

2. Acetic solution: 7 parts keratin; digest (warming, if necessary) in 100 parts glacial acetic acid.

The ammoniacal solution is adapted for pills containing pancreatin, trypsin, bile, iron sulphide, etc.

The acetic solution is adapted for pills containing salts of silver, gold, mercury, iron chloride, arsenic, creasote, salicylic acid, hydrochloric acid, etc.

In the case of chemically neutral substances, compatible with either solution, as, for instance, naphthalene, it is immaterial which solution is employed.—Chem. and Drugg., March 1, 1890, 292.

Pill Excipients—General Remarks.—A. S. Smith has written a useful paper on "Pills and their Excipients," which may be profitably referred to in Pharm. Journ. and Trans., Dec. 28, 1889, 513–515.

Pill Excipient—An Efficient Compound.—John Howard Witherow prepares a useful excipient for substances which are difficult to make into a proper pill-mass, by dissolving with the aid of a gentle heat 100 grains of gum arabic and 5 grains of benzoic acid in 2 ounces of glycerin, and adding 4 ounces of commercial glucose.—Amer. Jour. Pharm., Sept. 1889, 466.

Pill Excipient—Useful Formula.—F. E. Ray gives the following formula for a useful pill excipient: 8 parts of powdered gum arabic; 10 parts of glycerin. Mix in mortar and heat in a water-bath until clear.—Phar. Rec., Sept. 2, 1889, 263.

Pill Masses—Practical Observations.—Creasote pills have been recommended to be prepared by the use of wax or magnesia, but such pills placed in warm water for 24 hours remain intact and do not evince any signs of disintegration, showing the undesirability of these excipients. E. Dieterich gives a formula for a

Creasote Pill Mass, containing 25 per cent. creasote, which is plastic and will remain so for long periods if the quantity of glycerin given be doubled and the mass kept in well-closed vessels. Creasote, 10 parts, are mixed with glycerin, 2 parts, and triturated with powdered extract of licorice, 10 parts, finally incorporating powdered glycyrrhiza 18 parts. Pills made from this mass are easily disintegrated by the action of warm water; in dispensing the pills, finely powdered coffee is advocated as a dusting powder. For a

Copaiva Pill Mass (25 per cent.), the following gives excellent results: Copaiva, 10 parts; glycerin, 2 parts; mix and incorporate in the order named, powdered sugar, 10; magnesia, 10; powdered glycyrrhiza, 8. A

Turpentine Pill Mass is made in the same way as the copaiva pill mass. —Amer. Jour. Pharm., Jan. 1890, 17; from Pharm. Centralh., 1889, 676.

Compound Cathartic Pills, U. S. P.—Modification of the Formula.—Prof. W. M. Searby proposes the substitution of resin of jalap for the abstract now officinal, and the introduction of a little soap. The first seems advisable in view of the variation in the strength of jalap-root—the abstract bearing a definite relation to the root, and not to its active constituent. The introduction of soap is advocated because it not alone renders the resinous components of the pill more soluble, but, also, because it corrects the griping tendency of the pill. A possible objection to the latter is its decomposing action upon the calomel. The jalap resin, if introduced, should be finely divided by some inert substance, probably milk sugar. The formula, as he has modified it, and successfully administered some of the pills to a number of persons, without the usual symptoms of griping, is as follows:

Compound abstract of Colocynth	130 grains.
Resin of Jalap	18 grains.
Mild Chloride of Mercury	100 grains.
Gamboge, in fine powder	25 grains.
Olive oil soap, in powder	50 grains.
Water	6 grains.

To make 100 pills.

—Phar. Rec., April 21, 1890, 155–156; from Proc. Cal. Phar. Soc.

Pil. Colocynth. Co., B. P.—Prevention of Pitting on Drying.—Peter Boa finds that the pitting of compound colocynth pills can be prevented by one of the two following methods: In the one, he advises the use of kaolin, instead of sulphate of potash, and massing with water, as directed by the Pharmacopœia. The kaolin when dampened with water returned to its original condition of clay, which "set" in the pills and prevented pitting. The other method depends on the use of tragacanth. Two grains of tragacanth, three drops of glycerin, and water a sufficiency, were the quantities for a dozen pills. Neither method would alter the strength of the pills nor retard their solubility; while either of them very much improved their appearance.—Phar. Jour. and Trans., April 19, 1890, 866.

Permanganate of Potassium Pills—Proper Excipient.—A. Shaw made permanganate of potassium pills with three different excipients, and subsequently examined the pills in three, six and nine weeks after they were made. The exact formulæ for making the pills were as follows:

A.

Pot. permang.		24 grs.
Kaolin		6 "
Ung. resinæ		6 "

Ft. Pil. 12.

B.

Pot. permang.		24 grs.
Kaolin		6 "
Lanolin (anhydrous)		6 "

Ft. pil. 12.

C.

Pot. permang.		24 grs.
Kaolin		4 "
Hard and soft paraffin	aa	4 "

Ft. pil. 12.

The test applied to determine the amount of unchanged permanganate was that of the B. P. with ferrous sulphate. It was found that during the three periods above mentioned the amount of unchanged permanganate in these several pills (which were coated with tolu) was as follows:

	After 3 weeks.	After 6 weeks.	After 9 weeks.
A.	75 per cent.	72.5 per cent.	58.75 per cent.
B.	87.5 "	80 "	60. "
C.	96.25 "	93.75 "	87.75 "

From these figures it appears that kaolin and paraffin (ung. kaolin) is much the better excipient, $KMnO_4$ having undergone oxidation to the extent of about 11.75 per cent., whilst with the others almost 40 per cent. had become oxidized. It will be seen, however, that it is not advisable to keep a large stock of these pills in hand, as even with the best excipients deterioration cannot be avoided.—Pharm. Jour. and Trans., April 5, 1890, 823–824.

Permanganate of Potassium Pills—Preparation.—Vincens describes several methods for preparing permanganate of potassium pills. His first formula is as follows: Permanganate of potassium, 1 gm.; pure clay, 5 gm.; distilled water, 15 to 30 drops. Macerate the clay with q. s. of water to make a soft paste, and incorporate the permanganate of potassium. The pills are homogeneous, smooth, and break up readily in the stomach. They should be dried slightly and rolled in powdered talc. They are not (says the author) attacked by organic matters, and the salt does not decompose. The author adds that the following—a longer method—gave an equally good result: Silicate of potassium, 2 gm.; distilled water, 1.50 to 2 gm.; powdered talc, q. s.; permanganate of potassium finely pulverized, 1 gm. The silicate was well mixed with the water, and q. s., of talc was added to make a soft paste. In a few moments the mass became of proper consistence for division. The author gives the preference to the former preparation, as the silicate pills were not so readily soluble, and showed slight cracks on their surfaces.—Amer. Jour. Pharm., June 1890, 299: from Nouv. Rem., April 8, 1890.

Permanganate of Potash Pills—Excipient.—Gideon H. Macon proposes a slight modification of the paraffin excipient heretofore suggested for the preparation of permanganate of potash pills (see Proceedings 1885, 82). The proportions recommended by the author are: Soft paraffin, 2 parts; spermaceti, 1 part; kaolin, 3 parts.—Amer. Jour. Pharm., Sept. 1889, 467.

Pills of Salol—Preparation.—J. Past recommends for the preparation of salol pills that six grams of salol be triturated with two grams yellow wax until a soft mass is formed, which is then stiffened by addition of powdered althæa and magnesia.—Pharm. Ztg., 1889, 384.

Pills of Tar and Iodoform—Formula.—Negel gives the following formula for these pills, which, he says, are well supported by phthisical patients: Iodoform, 3 gm.; vegetable tar, 15 gm.; extract of opium, 60 cgm.; make 120 pills. The writer states that the addition of 5 to 10 per cent. of tar to iodoform, perfectly deodorizes the latter.—Amer. Jour. Pharm., Sept. 1889, 473; from Repert. de Phar., July 1889.

Creasote Pills—Formula.—See *Creasote*, under "Organic Chemistry."

Quinine Pills—Lactic Acid an Excipient.—Edmond Sohet recommends the use of 3 drops of lactic acid to 16 grains of quinine sulphate. This, he says, makes an excellent pill-mass, and the excipient is equally suitable when other ingredients than quinine form part of the pill-mass.—Chem. and Drugg., March 15, 1890, 347; from Bull. Soc. Roy. Phar. Brux.

PULVERES.

Powders—Methods of Dispensing.—Thos. S. Wiegand calls attention to the imperfect manner in which powders are frequently dispensed for prescriptions even in stores of good reputation. The ingredients should be placed into the mortar—which should be close-grained and free from uneven places—in the proper order. Active ingredients should be triturated first with a little milk-sugar; while instead of dividing the powders by taking small portions at a time on the end of the spatula, and adjusting the little heaps formed by the eye, it is better to spread it out on a ground-glass plate so as to form a parallelogram of even thickness, then dividing with a strait-edged spatula on the plate. This method of division is facilitated by placing beneath the glass slab a sheet of paper upon which parallel lines have been ruled at equal distances, and crossed in the same manner with parallel lines at right angles.—Amer. Jour. Pharm., Aug. 1889, 385–386.

Referring to the above paper, Hans M. Miller observes that while the "parallelogram plan" is a decided improvement on the "guess-by-eye," there is no reason why Mr. Wiegand should not go a step farther and advise the division by weighing each powder separately. This can be done more expeditiously than is generally supposed, and has the merit of absolute accuracy. In dividing a weighed quantity slight compensation must be made for loss by weighing off a fraction of a grain less than is ascertained by calculation, and any small quantity remaining may then be readily divided by the eye, the error, if any, being thus reduced to a minimum.——Ibid., Sept. 1889, 465–466.

Powders—Apparatus for Division.—W. F. Desan has invented a powder divider which secures the rapid and accurate division of powders, even admitting such when as small as one-eighth of a grain; and placing each powder on a separate paper ready for folding. The apparatus is figured in "The Western Druggist," Sept. 1889, page 332. Another device, by W. J. Hull, is figured and described in the same journal, Dec. 1889, page 440.

Soluble Saccharate of Iron—Athenstaedt's Formula.—The process of Athenstaedt for soluble saccharate of iron is given as follows: A solution of a ferric salt, 1:100, is precipitated by an equally strong solution of ammonia or a fixed alkali, taking care to operate at a temperature of about 10° C., and, in all cases, below 15° C. The precipitate must be washed rapidly in the dark and with distilled water, having a temperature between 10° and 15° C. The ferric hydrate is then mixed with powdered sugar in a quantity so regulated that the dry preparation will contain 3 parts of metallic iron to 100 parts of sugar. The mixture of hydrated iron and sugar is maintained at the boiling point until the iron becomes dissolved in the syrup. The dry product is obtained by drying *in vacuo* at a low temperature. This saccharate of iron may be kept in a solution made by diluting the mixture, when cold, with water. These solutions are clear, and remain so indefinitely.—Amer. Jour. Pharm., March, 1890, 132; from Monit. Scientifique, Nov. 1889.

Catarrh Snuffs—Various Formulas.—The "Jour. de Méd. de Paris" gives the following in chronic coryza: Alum, 2; borax, 2; zinc tannate, 3; bismuth tannate, 3; lycopodium, 8; menthol, 0.2 gm.

In scrofulous complications, the snuff is prepared of zinc sulpho-phenate, 0.2; zinc tannate, 2; iodol, 3; bismuth salicylate, 4, and powdered tobacco, 10 gm.

Another formula directs naphthalin, 25; boric acid, 25, and camphor, 1 part.—Amer. Jour. Pharm., April 1890, 173.

Antiseptic Powders—Preparation for the Use of Midwives.—Prof. Budin suggests antiseptic powder for the use of midwives, to be composed as follows: Bichloride of mercury, 25 cgm.; tartaric acid, 1 gm.; mark, "corrosive sublimate, 25 cgm.; poison; for one litre of water." Professor Budin also advises the use by midwives of a 1 per cent. ointment of bichloride of mercury with vaselin.—Amer. Jour. Pharm., April 1890, 180; from Acad. de Méd., Feb. 11; Monde Phar., Feb. 20.

Dusting Powders—Formulas.—E. Dieterich gives formulas for several dusting powders, as follows:

Diachylon Wound Powder.—5.0 lead plaster and 2.0 yellow wax with 20.0 ether are agitated in a flask until solution or perfect disintegration of the lead plaster results. 45.0 wheat starch, 45.0 talcum and 3.0 boric acid, all in very fine powder, are mixed in a mortar, then the ethereal solution added, perfumed with one drop each of the oils of wintergreen and bergamot, and exposed on parchment paper at ordinary temperature until the volatilization of the ether. This powder is valuable as a dusting powder in chafing, sore feet, etc.

Lanolin Dusting Powder.—5.0 anhydrous lanolin are dissolved in 20.0 ether and rubbed up with 45.0 wheat starch; by exposure the ether is allowed to evaporate. 2.0 powdered boric acid and 50.0 powdered talc are mixed with the lanolin starch powder, and flavored by the addition of one drop each of oil of wintergreen and oleo-balsamic mixture.—Amer. Jour. Pharm., May 1890, 158 and 159.

Salol Dusting Powder—Formula and Uses.—According to Dr. Kiezer a dusting powder composed of salol, 1 p. and starch, 8 p., has done excellent service in cases of wounds, burns, ulcers, defects of the skin, etc.—Amer. Jour. Pharm., April 1890, 172: from Prov. Med. Jour.

Sozoiodol Dusting Powder—Use for Burns.—According to Dr. Ostermayer a dusting powder composed of sozoiodol, 1 p., and starch or talc, 9 p., is useful to allay pains, and prevents suppuration in burns caused by direct flame, by hot steam, or by chemicals, such as caustic alkalies. The powder is odorless and non-poisonous.—Amer. Jour. Pharm., April 1890, 173; from D. Med. Wochensch.

RESINÆ.

Podophyllin—Historical Note.—J. U. Lloyd, in a paper on "Resin of

Podophyllum and Podophyllin" (uncomplete at the date of this Report), communicates a letter by Dr. John King, in which the latter gives an account of his discovery of podophyllin. This letter is of interest chiefly as an historical contribution relating to this important medicament.—Amer. Jour. Pharm., May 1890, 242-245.

Podophyllin Emodi—Examination.—F. A. Thompson, referring to the paper of Dymock and Hooper on *Podophyllum Emodi* (see Proceedings 1889, 467), in which they call attention to the large yield (12 per cent.) of resin from the root, communicates the results of his analysis of the "emodi podophyllin," as follows:

	Per cent.
Ash	None.
Moisture	4.2
Oily and waxy matter, soluble in benzin	4.0
Podophyllotoxic acid	13.1
Podophyllotoxin, active principle	56.55
Inert matter, insoluble in chloroform and soluble in alcohol	22.15
	100.0

The percentage of active principle, podophyllotoxin, in this sample is fully 25 per cent. higher than the average amount found in resin of podophyllum, which varies from 40 to 45 per cent. American podophyllum yields on a large manufacturing scale 5 per cent. of podophyllin, and accepting 10 per cent. as a practical average from the Indian, we would have a drug worth 2½ times in value.—Amer. Jour. Pharm., May 1890, 245-247.

SAPONES.

Soaps—Preparation for Medicinal Use.—The preparation of soap always requires the use of an excess of alkali, which should afterwards be removed by salting out the soap; to obtain a neutral soap this operation must be repeated several times, and the soap so obtained always retains some of the alkaline chloride. Dr. E. Geissler, in a paper on this subject, recommends that after the saponification of the fat a definite portion of the soap be removed, dissolved in alcohol and titrated with an acid; from this determination the calculation is made as to the quantity of hydrochloric acid needed to neutralize the excess of alkali, and after the addition of this quantity of acid the soap is evaporated to the proper consistence. For the detection of free alkali in soap it is proposed to take powdered soap and cover it with a solution of mercuric chloride, free alkali being indicated by the appearance of a red coloration. Neutral soaps in contact with mercuric chloride did not change in color after three months' time, while such soaps as indicated a slight alkaline reaction gradually blackened. Of importance is the fact that only such medicinal soaps (containing 2 per cent. $HgCl_2$) as do not give color with mercuric chloride are of antiseptic value. A criterion of good sublimate soap, hence, is its color; a discolored soap being worthless and therefore to be rejected.—Pharm. Ztg., 1889, 671.

Soft Soap—Formula.—Ralph St. J. Perry, in answer to a query, reports that soft soap is used to a considerable extent in medicine, and that some more explicit information as to its character and composition is desirable than that given by the Pharmacopœia. He recommends a formula prepared by Leo Eliel as the best. It is as follows:

Take of

Olive Oil	16 ounces.
Caustic Potash	6 ounces.

Dissolve 5 ounces of the caustic potash in two pints of water. Add 8 ounces of this solution to the oil, in a suitable vessel, place over a moderate fire, and stir until the mixture has become sufficiently thick. Gradually add the remaining portion of the caustic potash solution; stir occasionally until the mixture assumes a yellowish transparent, gelatinous form. Dissolve the remaining ounce of caustic potash in two pints of water, add to the mass, and evaporate to the proper consistency.—West. Drugg., Aug. 1889, 292–293; from Proc. Indiana Pharm. Assoc.

Another formula is that of A. Zimmermann, who uses 8 parts of caustic potash, 24 parts of olive oil, 12 parts of water. The potash being dissolved in the water, the solution is added to the oil, and the mixture stirred occasionally (during 24 hours or more) until saponification is complete, when sufficient water is added to make 56 parts.—Pharm. Rec., Dec. 16, 1889, 381–382.

Resin Soap—Preparation for Use as an Emulsifying Agent.—H. Collier finds resin soap a useful addition to the usual emulsifying agents. He prepares the soap by boiling gently for two hours in an evaporating dish, 1800 grains of resin with 300 grains of caustic soda, dissolved in one pint of distilled water. Upon cooling the soap separates as a yellow pasty mass, which is drained from the liquid, well squeezed, then heated on a water-bath until it becomes dry and friable, when it may be powdered in a mortar. Made in this way the soap is somewhat like powdered yellow resin; it is soluble in water and rectified spirit; from concentrated solutions prepared by heat, part of the soap separates on cooling, but gelatinization never occurs. The taste is resinous and somewhat acrid. Five grams dissolved in water, the solution acidulated with hydrochloric acid, and the liberated resin acids separated by ether, after drying, weighs 4.22 grams, corresponding to 84.4 per cent. of resin.

A solution of this soap answers excellently for extinguishing the globules of mercury, for emulsifying oil—either fixed or volatile—coal tar, and balsams, and for making permanent aqueous mixtures with tolu, spirit of camphor, etc. The amount of soap necessary is quite small (see *Emulsions* under "Misturæ").—Pharm. Jour. and Trans., March 15, 1890, 751–752

Glycerin Soap—Percentage of Glycerin in Commercial Samples.—L. J. Spenker has determined the amount of glycerin in various so-called glycerin soaps of the market by the following process: Five grams of soap are dissolved in hot water, decomposed with dilute sulphuric acid, and allowed to stand a half hour. The separated fatty acids are then collected on a filter, washed with a little water, the filtrate neutralized with barium carbonate, filtered, and this filtrate evaporated on a water-bath to a syrupy consistence. This residue contains the glycerin and various other organic matter that may be present, such as coloring matter, etc. The glycerin is extracted with a mixture of one part ether with three parts of 95 per cent. alcohol, the solution filtered, the filter washed with a little of the same solvent, the extraction twice repeated, and the united filtrates evaporated on the water-bath to a constant weight, and the percentage of glycerin calculated. Twelve samples examined gave results as follows:

No.	Description.	Per Cent. Glycerin Claimed.	Per Cent. Glycerin Found.
1	White glycerin soap, hard, easily powdered.	No claim.	None.
2	Glycerin soap, hard, yellow color.	No claim.	None.
3	Glycerin soap, hard, easily powdered, chocolate brown.	No claim.	None.
4	Glycerin soap, hard, transparent, very brittle.	No claim.	None.
5	Transparent glycerin soap, very hard and brittle.	30 per cent.	None.
6	Pure glycerin soap, very hard and brittle.	50 per cent.	None.
7	Bay-berry glycerin soap, soft, green, in tin-foil.	No claim.	36.47
8	White, translucent glycerin soap, soft.	No claim.	23.87
9	Transparent glycerin soap, yellow, not very hard.	No claim.	17.67
10	Transparent glycerin soap, hard, reddish.	No claim.	9.00
11	Transparent glycerin soap, very hard, brittle, reddish.	33 per cent.	6.89
12	Glycerin soap, not quite transparent.	"33 per cent. pure glycerin."	5.91

The author further observes that in testing the soaps the ordinary qualitative tests failed to respond. A good test for glycerin is to treat the substance with a little pyrogallic acid and a few drops of dilute sulphuric acid and boil, when the mixture will turn red. Now add a little stannous chloride, and a beautiful violet-red is produced.—Pharm. Era, Nov. 1889, 414–415; from Proc. Mich. Pharm. Assoc., 1889.

Crême d'Amandes—Preparation.—The "Chem. and Drugg." (June 28, 1890, 859) says that Crême d'Amandes, which is sold as shaving cream, is simply a carefully-made potash soap perfumed with essential oil of almonds. In order to acquire the knack of making it, experiments should be made on a small scale. One lb. of the finest lard, free from salt, is melted in a sand or water bath at a gentle heat in a well-enamelled vessel. It should be stirred constantly with a wooden spatula, and as soon as it is in a fluid condition, resembling thick milk, one-fourth lb. of potash lye at 36° is added. The stirring must be continued, and the temperature should be maintained at one level. The combination is gradually produced, and the stirring will have to be continued for about an hour, or until it is seen that grains of soap sink to the bottom and an oily layer tends to rise to the surface. Then another one-fourth lb. of lye is added, and this is followed by steady stirring for, perhaps, two or three hours. Ultimately the compound becomes too much set for simple stirring, and needs beating. The heat is now withdrawn, but the vessel is allowed to cool gradually, the beating being continued. In order to give it the desired pearly appearance, the soap is transferred to a marble mortar and vigorously whipped, the almond essence being worked in at this time. A similar cream, but perfumed with styrax and benzoin instead of almonds, is called *Crême d'Ambroisie.*

SPIRITUS.

Spirit of Nitrous Ether—Improved Process.—Dr. E. R. Squibb reviews the U. S. P. process for the preparation of spirit of nitrous ether, of 1850, 1870 and 1880, the Br. P. process of 1885, a paper on this subject published by him in 1856, and gives the results of examination of commercial samples occurring in commerce in 1856 and in 1889. Respecting the process of the Pharmacopœia of 1880, he remarks that it is a well-constructed, easy and convenient one, and yields a fairly uniform product, though not in uniform quantity. The principal objections are that: 1. The sulphuric acid for the reaction is absolutely useless; 2. The alcohol is not as strong as is desirable; 3. The quantity of alcohol directed for the reaction is largely in excess of the quantity necessary; and 4. The most important objection, the process, while yielding a product containing 5 per cent. of *its peculiar and characteristic ethereal liquid*, does not yield 4 per cent. of *real ethyl nitrite*, as stated in the Pharmacopœia, but at best only 2.82 per cent. Under these considerations, and as the outcome of his large experience and comprehensive studies, Dr. Squibb proposes an improved process, suitable for adoption in the next revision of the Pharmacopœia, of which the following are the essential features:

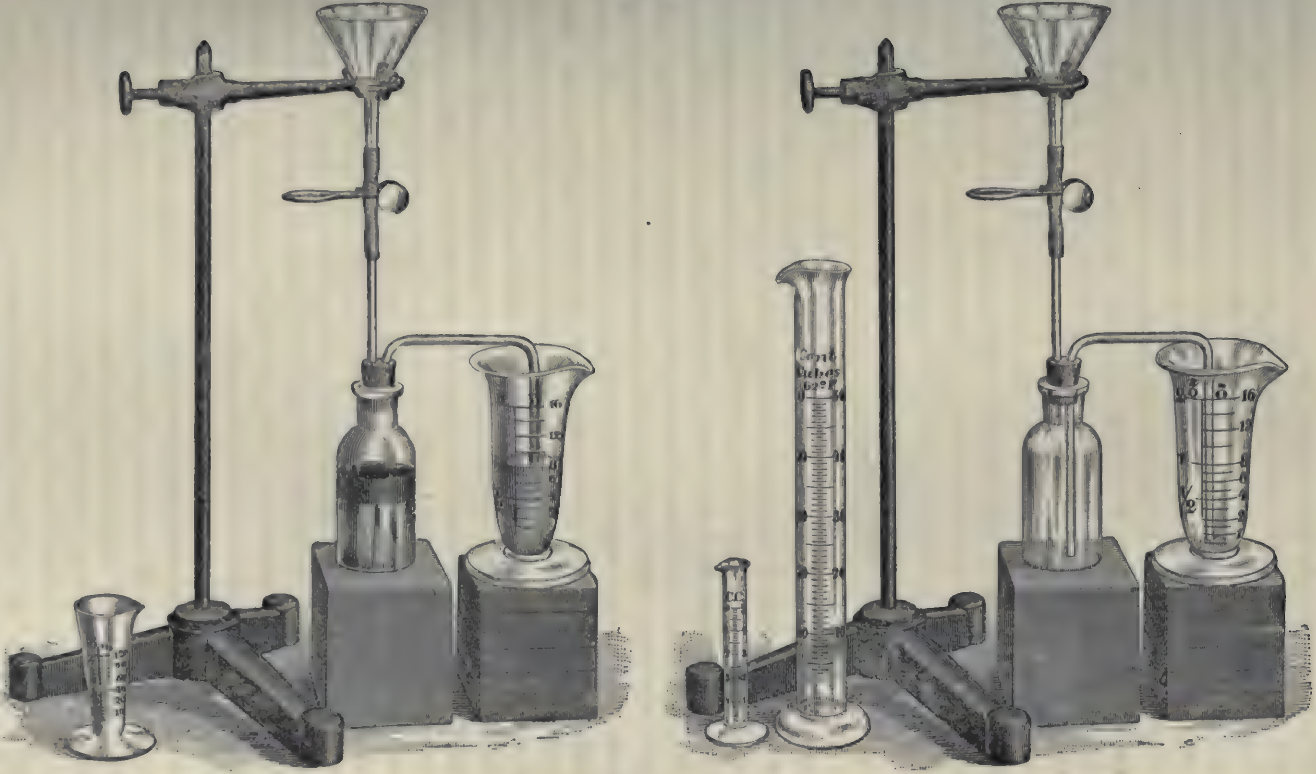
A mixture of 34 parts of alcohol, s. g. 0.815, and of 20 parts of nitric acid, s. g. 1.42, is subjected to distillation in a tubulated retort, containing broken glass, with the observance that all the connections be tight, that the condensing facilities be perfect, and that the reaction may be moderated or increased at will, this being accomplished by changing the water-bath from hot to cold or cold to hot as may be necessary. The distillation is continued until about 6 parts remain in the retort, the distillate being collected in a receiver surrounded by ice, and from which a bent tube passes into 16 parts of alcohol contained in a flask also surrounded by ice. At the completion of the process the ethereal liquid is immediately poured into a flask containing an ice-cold solution of 1 part of sodium carbonate in 32 parts of water, the contents are vigorously and repeatedly shaken, kept cool by occasional immersion of the flask in ice water, and the ethereal layer is separated and at once mixed with eleven times its weight of alcohol (s. g. 0.815), employing the contents of the flask at the end of the condensing apparatus as part of this alcohol of dilution. Finally, the product is carefully treated with stronger water of ammonia until the finished spirit turns neutral litmus paper to a purple tint. The s. g. of the spirit of nitrous ether, so prepared, is 0.821 to 0.823 at 15.6° C. Its pale-yellow color is turned to yellow by an equal volume of weak solution of potassa (made with equal volumes of officinal solution of potassa and water), and this color is deepened, but not browned, after 12 hours standing. It contains 8.33 per cent. of the complex ethereal liquid (as against 5 per cent. of the product of the U. S. P., 1880), and gives a nitrometer indication of 5 per cent. of ethyl nitrite. In full and well-stoppered bottles, or when little exposed to light and air, it keeps practically unchanged for several months.

The author, furthermore, exhaustively reviews and gives his experience respecting the changes to which the spirit is subject by exposure and keeping, the tests necessary to establish its quality, and describes an

Extemporaneous Nitrometer, which answers as a rude substitute for "Lunge's Nitrometer." This substitute is shown by the accompanying cut (Fig. 30), two views being given, the one on the right being empty, to show the detail of its material and construction, the other showing the apparatus at the end of the assay process, when the measure is to be read off. Two sets of measures are shown, the ordinary graduated and the French metric, either of which will do, the preference being for the narrow metric cylinder. In charging this apparatus for testing, the vial is filled so nearly full of mercury that when ten or twenty drops of water are put upon it the neck is full to the lip. Then when the cork is pushed into its seat the water overflows and the end of the cork takes the place of it, and comes nearly or quite in contact with the surface of the mercury, and the pinchcock being off, the mercury rises in the two tubes, and fills a part of the horizontal portion of the bent tube. Then the funnel is connected with the vial by slipping on the lower end of the rubber tube, and the pinchcock being closed, about 1 c.c. of dry mercury is put into the funnel, and is slowly and cautiously let down into the vial by slightly opening the pinchcock, until the bent tube is entirely filled with mercury, and some little has escaped into the receiving measure. When this little mercury is poured out and the measure replaced, the apparatus is ready for the assay. There must, of course, be no leaking at any of the connections, and should there be any leakage it is at once recognized by the mercury continuing to drop from the tube into the measure.

If the common U. S. P. measures are used, 1 fl. drachm of the spirit of nitrous ether to be assayed is measured into the funnel and cautiously let into the vial by means of the pinchcock. Next the same quantity of solu-

FIG. 30.



Extemporaneous Nitrometer.

tion of potassium iodide (2 grams in 5 c.c.), and finally, the same measure of diluted sulphuric acid (2 grams in 6 c.c.) is allowed to flow in, these additions being very cautious and gradual, in order to avoid the forcing of the gas, which immediately begins to form, up through the funnel. In 10 minutes the reaction is practically completed, and the quantity of mercury which has passed into the graduate is read off. From this is deducted 3 fl. drachms, to allow for the liquids introduced for the reaction, the remainder being taken as the measure of the volume of gas produced, and this volume should be 11 to 13 times that of the spirit of nitrous ether used for the assay if the spirit contains 5 per cent. of ethyl nitrite. Each per cent. of indicated ethyl nitrite is about equal to 1.86 per cent. of total complex ethereal liquid in the spirit. The author also describes a modification of Lunge's nitrometer, with which accurate work is readily done, and for a description of which reference must be had to the original paper. —Ephemeris, July 1889, 1176–1243.

Spirit of Nitrous Ether—Preparation from Pure Ethyl Nitrite.—T. S. Dymond, after some general criticisms of Dr. Squibb's paper on spirit of nitrous ether (see above), particularly criticizes Dr. Squibb's objection to the preparation of the spirit from pure ethyl nitrite, as suggested by Professor Dunstan and the author several years ago (see Proceedings 1888, 488-489). To the objection that the favorable experience with spirit of nitrous ether for six hundred years should not so easily be set aside, Mr. Dymond replies that there is no evidence that the spirit as now employed, made from a purer ethyl nitrite, is less efficient than one made by the older processes. To the second objection, that only three-fifths of the complex ethereal constituent of spirit of nitrous ether is ethyl nitrite, the remaining two-fifths having a definite physiological effect, the author replies that the two-fifths of the "complex ethereal liquid," which no one seems to have taken the trouble to analyze, but which, undoubtedly, chiefly consists of paraldehyde and acetic ether in varying proportions, has, of course, a definite physiological action, but that it is the ethyl nitrite which is the therapeutic agent required. It is ethyl nitrite which is regarded by therapeutists as the active constituent of spirit of nitrous ether; it is ethyl nitrite, the proportion of which it has been designed to increase in the successive processes for its preparation; it is ethyl nitrite which is alone estimated when the value of the preparation is determined; it is on the presence of a certain proportion of ethyl nitrite that the British Pharmacopœia insists. If, however, it were shown that a mixture of ethyl nitrite, paraldehyde and acetic ether were a more valuable therapeutic agent, let such a mixture be made in definite proportions, and thus avoid the risk and uncertainty of the use of a preparation which, from the nature of the reaction, must necessarily vary in composition. To the third objection, that the keeping properties of a pure solution are no better than those of a neutral spirit made with equally strong alcohol, the author answers that the stability of a pure solution of ethyl nitrite is indeed no greater than that of a neutralized and purified spirit made with alcohol of equal strength, but it is far greater than that of the spirit of the British Pharmacopœia, in which the water and free acid invariably present rapidly decompose the ethyl nitrite. In the paper criticized by Dr. Squibb it is shown that ethyl nitrite disappears from a solution in rectified spirit twice as fast as from a solution in absolute alcohol. The loss of ethyl nitrite from spirit of nitrous ether is a constant source of annoyance to the pharmacist, and there is no doubt that this loss is as often due to decomposition as to volatility.

In advocating the introduction of a solution of ethyl nitrite, stress must be laid on the far greater ease with which it is made. It is well known that the production of spirit of nitrous ether is a process attended with a good deal of difficulty, and even danger. Large retorts are required, and elaborate condensing arrangements if loss is to be avoided, and after all precautions are taken, the operator is sometimes unable to control the violence of the reaction, and great loss occurs. Ethyl nitrite is prepared easily and quickly in quantities sufficient to make from 1 pint to several gallons of the solution. Distillation is avoided, and the only apparatus required is a tall glass cylinder, a long thistle funnel, and a stoppered separator. The cost of the ingredients is no greater, except that as absolute alcohol is employed for dissolving the ethyl nitrite instead of rectified spirit, the cost of the solution is about 20 per cent. more than spirit of nitrous ether, an increase which will not be grudged when the increased stability of the preparation is considered.

The advantages which would be gained by the introduction of such a solution of ethyl nitrite may be thus summarized: It is easily prepared, its active constituent does not decompose, it has a definite and constant composition, the ethyl nitrite does not escape from it readily, it possesses the full therapeutic value of spirit of nitrous ether as far as present evidence has shown. Such being the case, the author believes that to pharmacists the replacement of the old spirit by the new solution will be a great advantage, and it is for them to bring it under the notice of the medical profession. The chemistry and pharmacy of the question are complete, and it remains for therapeutists to give their opinion upon its employment. If that opinion is favorable, the preparation could be inserted in the Pharmacopœia as an alternative to spirit of nitrous ether. By this means the old spirit would be gradually replaced by the new solution, and another advance made in the application of scientific methods for the production of pharmaceutical preparations.—Pharm. Jour. and Trans., March 15, 1890; 755–757.

Spirit of Nitrous Ether—Rapid Method of Testing.—B. S. Proctor proposes a rapid method for testing spirit of nitrous ether, which dispenses with the use of the nitrometer. A solution of hyposulphite of soda is prepared of such a strength that the reaction is completed with a fluid drachm of spirit of nitrous ether, a little above the normal strength; and, having ascertained how much of the sample under trial completes the reaction, calculate the relation which the sample bears to the normal. For this purpose it is convenient to prepare the solutions thus:

No. 1.	Hyposulphite of soda	4 grains.
	Chloride of sodium	40 "
	Iodide of potassium	20 "
	Water	2 drachms.
No. 2.	Spirit of nitrous ether (the sample to be tested)	2 fl. drachms.
	Dilute sulphuric acid	1 fl. "

Place the former in a shallow dish—the lid of a 3 or 4 oz. ointment pot is suitable. Add to this fl. ʒiss. of No. 2 (*i. e.*, containing fl. ʒj. sp. æth. nit.), stir well, and blow away the ruddy fumes as fast as they form on the surface of the effervescing liquor. If the solution has acquired and retained a brown color, it will indicate that the fl. ʒj. of spirit of nitrous ether which is contained in this addition would have evolved more than seven volumes (fl. ʒvij.) of nitric oxide gas, had it been tested in the nitrometer by the B.P. process (about 7.4 vols.). If, however, the brown color was not permanent, the No. 2 solution may be added in like manner, fl. ʒss. at a time, with stirring and blowing off the ruddy fumes till the brown color is permanently developed. As each addition of fl. ʒss. means 20 minims of the spirit of nitrous ether, the quantity required to evolve 7.4 fluid drachms of nitric oxide gas is ascertained, and from this datum the volumes of gas liberated by one volume of the spirit may be calculated. Thus, if the first fl. ʒiss. of No. 2 gives a brown tint, we say the sample gives 7.4 volumes or more.

Fl. ʒij. being required = 5.5 vols.
Fl. ʒiiss " " = 4.4 "
Fl ʒiij. " " = 3.7 "

The first would be rather over strength, the second a fair average strength, the third would be on the debateable ground left doubtful by the official statement that it is to yield "not much less than five volumes," the fourth, we would say without hesitation, was below the strength which should be sanctioned. The points about which care is required in the performance of this test are to avoid loss of nitrous ether by evaporation, and to avoid continued contact of the nitric oxide gas with the air and with the solution containing the iodide, as the nitric oxide combines with oxygen from the air, and yields it up readily to the hydriodic acid, which has been liberated from the iodide of potassium by the action of the sulphuric acid. This latter source of error is sought to be avoided by the addition of chloride of sodium to the No. 1 solution—nitric oxide being less soluble in brine than in water—and by operating in a shallow dish, and blowing off the gas as it is liberated. The loss by evaporation of nitrous ether is sought to be avoided by making the additions of the spirit of nitrous ether to an excess of the solution of iodide and hyposulphite until the terminal reaction is reached. This process makes no pretension to scientific accuracy, but readily indicates whether or not the sample under examination would evolve such volume of gas as comes within the limits fixed by the authorities. Or if the percentage of nitrite of ethyl be defined, as has recently been suggested, the 7.4 vols. correspond to 2.6 per cent. and 3.7 vols. equals 1.3 per cent., this latter being as high as might be looked for in an article not sold as spiritus ætheris nitrosi, but as sweet spirit of nitre.—Chem. and Drugg., July 27, 1889, 146–147.

Spirit of Nitrous Ether—Method for the Assay of Ethyl Nitrite, which see under "Organic Chemistry."

Spiritus Menthæ Piperitæ—Addition of Coloring Matter.—Hans M. Wilder observes that the green color of essence of peppermint being organic, is bound to fade sooner or later, especially in sunlight. The directions of the Pharmacopœia not insuring uniformity in the shade of the color, he has been in the habit of coloring the spirit of peppermint as follows, which he thinks is an improvement: He percolates coarsely-ground peppermint with strong alcohol, rendered distinctly alkaline with a few drops of ammonia. The proportions of herb and alcohol are immaterial, so that a dark green tincture results; previous maceration for 24 hours facilitates the extraction. When the stock of spirit of peppermint runs low, he takes any quantity of alcohol (according to the capacity of the bottle) and adds sufficient of the tincture till the usual shade is obtained; finally he adds the proper quantity of oil of peppermint, considering the tincture added as merely so much more alcohol, disregarding what flavor it may possess. Ammoniated alcohol extracts the green color of dried leaves better than plain alcohol.—Pharm. Record, Sept. 2, 1889, 271.

Eau de Cologne—A Prize Formula.—The Paris correspondent of the "Pharm. Record" (Sept. 16, 1889) states that the following formula for cologne water has been awarded the prize offered by a London perfumery firm for the best formula:

Essence of bergamot	2 drachms.
Essence of lemon	1 drachm.
Oil of neroli	20 drops.
Oil of origanum	6 drops.
Oil of rosemary	20 drops.
S. V. R., treble-distilled	20 fluid ounces.
Orange flower water	1 fluid ounce.

The correspondent points out, however, that to speak of drops in a formula of this kind is, to say the least, vague and indefinite; but probably minims were intended and could be satisfactorily employed. It should be remembered, also, that eau de cologne, like good wine, improves with keeping; and it is stated that the original Farinas keep their celebrated perfume a year before sending it out; a practice that has been adopted by many other perfumers.

Heliotrope Extract—Formula.—According to E. Campe, heliotrope perfume may be made as follows:

Oil of bergamot	1½ oz.
Vanillin	8 grains.
Tincture of benzoin	2 drachms.
Rectified spirit	60 oz.

Solve.

—Chem. and Drugg., March 15, 1890, 347; from Chemiker u. Drogist.

SUCCI.

Lemon Juice—Acidity.—T. Howell Williams expresses the opinion that the amount of citric acid in lemon juice is fixed much too high by the present B. P. In the B. P., 1867, the specific gravity was stated as 1.039 and the contents of a fluidounce in citric acid as 32.5 grains; in the B. P., 1885, the specific gravity is given as 1.035 to 1.045 and the citric acid as 36 grains to 46 grains to the fluidounce. In Mr. Williams' opinion, 30 to 36 grains of citric acid in the ounce would more correctly represent the amount present in the lemon juice as commonly obtained from the finest imported fruit during the winter months, and from 20 to 30 grains when the juice is pressed in summer and autumn.—Yearbook of Pharm., 1889, 473–479.

Pine Apple Juice— Value in Bronchitis.— Pine apple juice has been found by Dr. Flascher of excellent service in bronchitis, in softening the mucus. For preparing the juice, the fruit is sliced, sprinkled with sugar, heated to boiling, and strained. The dose is about two tablespoonfuls.—Amer. Jour. Pharm., April 1890, 178; from Lyon Médicale, Oct. 1889.

SUPPOSITORIA, ETC.

Suppositories.—A very comprehensive paper on suppositories, giving their history, materials suitable for their preparation, materials to be incorporated, and special methods for their preparation, by F. A. Hocking and E. Brooke, was read before the School of Pharmacy Students' Association, London, Feb. 27, 1890, and may be profitably consulted in Pharm. Jour. and Trans., April 19, 1890, 851–854.

Glycerin Suppositories—Formula.—Henry F. Morgan gives the following simple and convenient formula for making glycerin suppositories, which is especially adapted for use at the prescription counter: Glycerin, 90 parts; powdered white castile soap, 10 parts. Mix by heating on a water-bath, strain and mould.—Pharm. Rec., May 5, 1890, 176.

Chloral Suppositories—Combination with Belladonna.—Suppositories of chloral are recommended by Yvon to be combined with belladonna to prevent irritation, as follows: Chloral hydrate, 0.5; extr. belladonna, 0.3; cacao butter, 3.0 gm.—Amer. Jour. Pharm., April 1890, 173; from Rev. de Clinique.

Plastic Pencils—Preparation with Soap.—Garesnier proposes the preparation of pencils or crayons with soap, which makes them plastic.

Copper Crayons are made as follows: Sulphate of copper, 1 gm.; white Marseilles soap, 30 gm. The copper salt is first pulverized in a warm mortar; then the soap (rasped) is added, together with 30 drops of glycerin and 10 drops of oil of ricinus. The mass is then heated in a water-bath until it becomes semi-fluid, when it is drawn by aspiration into glass tubes and allowed to cool, being first slightly compressed by means of a wire and a ball of cotton. After cooling, the pencils are pushed out and wrapped in paper.

Crayons of Creasote are made in the same manner after the following formula: Creasote, 1 part; soap, 4 parts. The author says that

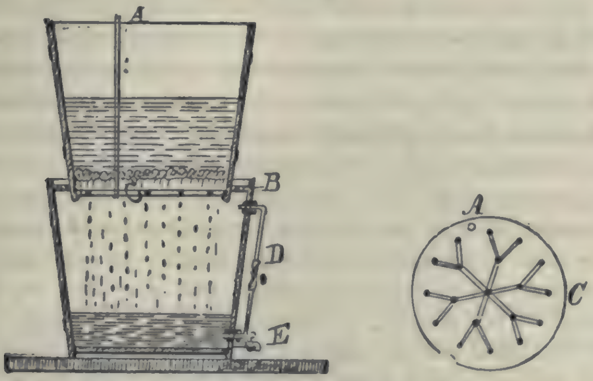
Crayons of Iodide of Potassium and

Crayons of Carbolic Acid may be made in the same way.—Amer. Jour. Pharm., March 1890, 133; from Bull. Soc. de Pharm. de Paris, Dec. 4, 1889.

SYRUPI.

Syrup Percolator—Novel and Cheap Construction.—Edward T. Mitchell describes the syrup percolator shown by Fig. 31, which is constructed of two ordinary candy pails. *B*, the cover of the receiver, has a circular hole cut in, through which the percolator passes. *A* is a wooden vent cut through the bottom *C*, of the percolator, which has holes bored in it, and has grooves cut to connect them as shown in the cut. *D* is a gauge to show the height of the syrup in the receiver. It is conveniently made

FIG. 31.



Syrup Percolator.

by two feeding-bottle corks inserted in auger-holes near the top and bottom, the glass gauge being constructed of two pieces of tubing, connected with a piece of rubber tubing in the centre. *E* is an ordinary faucet. This gauge may be graduated to indicate successive portions of one-half gallon, the markings being made on a piece of wood placed alongside of the glass tube, and protecting it. All cracks, crevices and joints of the percolator and receiver must be made air-tight by suitable lutings, and the bottom of the receiver should be coated with shellac, the outside also being painted. After thoroughly soaking the apparatus until the water no longer has a woody taste, two thicknesses of cotton flannel, cut slightly larger than the diameter of the bottom of the percolator, are wetted and placed upon the bottom, the fuzzy side up. The apparatus is then ready for making syrup by percolation in the well-known manner.—Nat. Drugg., Feb. 1, 1890, 49; from Proc. Ark. Pharm. Assoc.

Syrups—Preservation—H. Helbing observes that to insure the permanence of some syrups in good condition is a considerably more difficult task than preparing them even by the most complex process. Preparations of this class which contain vegetable extractive matters exhibit a proneness to ferment which the utmost ingenuity of the pharmacist is often powerless to frustrate. As soon as he wants to use one of them he finds the bottle filled with a frothy, pungent-smelling and tasting liquid, which agrees in its physical properties with nothing in the Pharmacopœia, to omit all consideration of its medicinal virtues. Under such conditions the preparation has to be boiled or strained before it is fit for dispensing, or more often it is thrown away. The trouble often is partly brought about by the fact that for a few days there may be a run upon a certain kind of syrup, which may not for a long time be wanted again. The partially empty vessel stands therefore more or less securely stoppered for weeks, or even months, until, when it is required again, the contents are found to have undergone such changes as render them almost unrecognizable. A great number of methods have been proposed for obviating this inconvenience, many of which are open to serious objection. That which the author has found most useful has the merit of in no way affecting the composition of the preparation. The syrups must be stocked in very small vessels; for some kinds bottles of 2-oz. capacity will be quite large enough, and as a rule 4 oz. should not be exceeded. They must be, of course, clean and perfectly dry before filling with the liquid still hot, which is prepared by the ordinary or pharmacopœial method. Each bottle is filled right up to the top of the neck, leaving no space even for the insertion of a cork. Instead of this the syrup is fastened up in the following manner: A number of discs of thick, felty filtering paper are cut, having a slightly larger diameter than the outer margin of the top of the bottles. One of these discs is then laid on the top of each bottle and pressed down at the edges. Of course it becomes at once saturated with the syrup. On cooling, the volume of the syrup naturally contracts somewhat, and as a consequence the disc of paper tends to be sucked in. As, however, the aqueous portion of the hot syrup quickly evaporates from the surface of the filtering paper, a crust of crystalline sugar is left behind, which is entirely impervious on the one side to air and on the other to the syrup. The latter having been introduced, after a more or less prolonged boiling, into a clean and dry bottle, we have a sterilized saccharine liquid in a bottle sealed up from the action of air or of the germs floating in it. Thus fermentation is prevented, and the only changes which can occur in the preparation will be entirely internal, and such as can only be effected by modifying the nature or proportions of the ingredients. When the syrup is wanted for use the cap is readily removed with a knife. This method of preserving syrups from fermentation is practical and practicable for all; it is effective, and does not entail the use of expensive apparatus or complicated manipulation.—Amer. Drugg., June 1890, 106; from Brit. and Colon. Drugg.

Medicinal Syrups—Improvements of the Present Officinal Formulas.—Ferdinand Lascar offers some suggestions with the view to improving the officinal syrups. In preparing

Simple syrup and several other syrups, clearing with the white of an egg ought to be recommended. This very simple method of adding dilute albumen to the syrup previous to boiling, vastly improves the preparation and adds to its stability. In the case of

Syrup of Raspberry stress should be laid upon this fact. There should also be given a better test than now, guarding against the frequently found abominations of artificial, fraudulent raspberry juice.

Syrup of Calcium, beside needing a specific gravity figure, ought to be more explicitly described; we should find directly how much lime this syrup actually shall contain.

Syrup of Hypophosphite of Calcium would, in the estimation of many, be improved by being made sufficiently acid by hypophosphorous acid. The

Syrup of Hypophosphite of Calcium with Iron, using the lactate, is not an elegant preparation, and better methods may be suggested. The preparation with iron does not keep as well as the one without.

Syrup of Lactucarium made from fluid extract is an unsightly syrup. If this rarely-used syrup is to be retained, or is intended to regain its former position, we must try to have a clear syrup, and not one where half of the drug remains stuck to the inside of the containing bottle.

Syrup of Lemon, as now made, changes in appearance, odor and taste too quickly. It is apt to mould and deteriorate. An addition of 4 to 5 per cent. of alcohol must be considered an improvement. If

Syrup of Senega is expected to remain clear when diluted with water in mixtures, an improvement in the present process is demanded. The old manner of preparing an infusion of the root in which sugar is dissolved is preferred by many, and when such a syrup is further cleared with albumen, a splendid product is obtained. In preparing

Syrup of Wild Cherry Bark, we find that the product of the present formula too frequently ferments; in fact, in many localities where the climate is moist and hot the greater part of the year, this syrup will change in spite of the glycerin present. As the syrup of wild cherry is one of the most frequently employed medicinal syrups, attention should be given this subject.

Syrup of Cascara Sagrada.—A drug which in the present decade has met with phenomenal favor is cascara sagrada. Its more than unpleasant taste and the fact that it is daily prescribed for infants should suggest some officinal formula for a syrup, as the fluid extract is frequently more trying to the patient than the disease itself. Fluid extract of liquorice has so far proved the best adjuvant for cascara, and a somewhat palatable syrup of this important drug ought to find a place in the Pharmacopœia.—Drugg. Circ., April 1890, 76.

Syrup of Licorice—Value for Disguising the Taste of Quinine.—Henry Franz has made experiments to determine the relative value of licorice, yerba santa and saccharin for disguising the taste of quinine. He finds a syrup of licorice, prepared as follows, to be efficient; a fluid drachm disguising 2 grains of quinine sulphate:

Ext. licorice	2 Troy ozs.
Sugar	10 " "
Water sufficient to make 16 fluid ounces.	

Dissolve the extract in 8 ounces of water on a water bath; add the sugar and dissolve it, strain, add the glycerin and enough water to make 16 fluid ounces. A more efficient preparation for this purpose, however, is the

Solution of Extract of Licorice, N. F., which he makes as follows from the so-called "tub licorice" used by tobacconists—this being peculiarly pure, of very rich flavor, and sweet taste: Take a small portion of the extract, dry to constant weight and note the loss of moisture. Then take of the extract a quantity equivalent to 4 troy ozs. of dry extract; dissolve in 4 fluid ounces of water on a water-bath; add 4 fluid ounces of glycerin, cool; add 2 fluid ounces of alcohol, and sufficient water to make 16 fluid ounces. This solution is an agreeable preparation, and has a disguising power of 3 grains quinine to the fluid drachm. Saccharin did not overcome the bitterness, but a

Syrup of Yerba Santa, prepared as follows, answered better than any of the foregoing, disguising 4 grains of quinine sulphate per fluid drachm:

F. E. Yerba Santa	6 fluid drachms.
Liquor potass.,	200 minims.
Sugar	13 Troy ounces.
Water sufficient to make 16 fluid ounces.	

Add the liquor potash, fluid extract and 1½ fluid ounces of water to the sugar contained in a wide-mouthed bottle; place the bottle in boiling water until the sugar is, dissolved, and strain.—Pharm. Era, Nov. 1889, 417; from Proc. Mich. Pharm. Assoc., 1889.

Syrup of Yerba Santa (Aromatic)—Formula.—D. L. Haigh recommends the following formula for making syrup of yerba santa, in which the use of alcohol as menstruum is dispensed with:

Yerba santa, coarsely ground	1 lb.
Sugar	6½ lbs.
Oil coriander	30 minims.
Oil cassia	8 "
Oil cloves	8 "
Pumice	q. s.
Hot water, q. s. to make	1 gallon.

Exhaust the drug by percolation with hot water, using 3 portions, allowing the first portion to remain on the drug several hours. Percolate until 3½ pints of menstruum have passed through. Rub this with q. s. pumice; add the oils, and continue to rub until these are thoroughly incorporated. Filter and add through the filter sufficient water to make the filtrate measure 3½ pints. In this dissolve the sugar without heat. The product is a beautiful reddish-colored syrup which has a fine odor, and gives very general satisfaction.—Pharm. Era, Oct. 1889, 378–379.

Chocolate Syrup—Formula for Soda Fountain.—The following formula for choclate syrup is said by L. G. Heinritz to be superior in strength and flavor to those made with the prepared chocolate or extracts now in the market:

Confectioner's Chocolate	½ pound.
Hot Water	2 quarts.
Condensed Milk	1 can.
Granulated Sugar	5 pounds.
Whites of two Eggs.	
Extract of Vanilla	1 ounce.
Gum Foam	1 ounce.

Cut the chocolate finely into a porcelain-lined evaporating dish, and with the acid of heat and a pestle reduce the chocolate to a smooth paste. Add the water (boiling hot) gradually, stirring constantly; then stir in the condensed milk and sugar until both are dissolved. When cold, skim off the cocoa butter, particles of chocolate, etc., add the beaten white of eggs, vanilla, and gum foam, and strain through muslin. Confectioner's chocolate costs from 28 to 35 cents per pound, and the cost of the entire materials is about 95 cents per gallon.—Amer. Drugg., March 1890, 56; from N. E. Druggist.

Syrup of Coffee—Formula.—E. Dieterich gives the following formula for a syrup of coffee: 200.0 finely-ground coffee are moistened with 250.0 distilled water and 50.0 spirit of cognac, and then 800.0 boiling simple syrup added; the vessel is covered, set aside for 15 minutes in a moderately warm place, and after standing at ordinary temperature for 24 hours, the liquor is filtered. This formula gives a superior product, if the directions are followed closely.—Pharm. Centralhalle, 1890, 160.

Creasote Syrup—Formula.—Bretter prepares creasote syrup by mixing 20 parts of glycerite of creasote (see "Glycerites") and 140 parts of syrup.—Ztschr. Oester. Apoth. Ver., 1890, 138.

Syrup of Hypophosphite of Calcium—U. F. B. P. C.—

Take of—

Hypophosphite of calcium	160 grains.
Distilled water	9 fluid oz.

Dissolve and filter. To the filtered solution add

Refined sugar	1 pound.

Dissolve with the aid of a little heat, strain, and add after cooling,

Hypophosphorous acid	20 minims.
Distilled water	Sufficient to produce 1 pint.

Mix. Each fluid drachm contains 1 grain of hypophosphite of calcium.

Syrup of Hypophosphite of Sodium—U. F. B. P. C.—

Take of—

Hypophosphite of sodium	160 grains.
Distilled water	3 fluid drachms.

Dissolve, filter and wash the filter with distilled water, 1 fluid drachm. To the filtered solution add

Syrup, sufficient to produce	1 pint.

Mix. Each fluid drachm contains 1 grain of hypophosphite of sodium.
—Yearbook of Pharm., 1889, 527–528.

Syrup of Phosph. Iron, Quinine and Strychnine—Importance of Avoiding Excess of Sugar.—T. Maltby Clague calls attention to the fact that samples of Easton's syrup are sometimes met with which through the influence of a low temperature have undergone such change as to render them unfit for use. In one case the "syrup" was a jelly-like mass, with long needle-shaped crystals and tufts of crystals, and a smaller amount of fine white precipitate showing. Warmth brought about solution, but precipitation again took place on cooling to about 32° F. It was found, however, that the addition of 25 per cent. of water sufficed to maintain solution at the lower temperature, and that this was not affected upon the addition of the quinine, strychnine and ferrous phosphate requisite to bring it up to Easton's strength. The high specific gravity of the samples pointed to excess of sugar as the source of trouble, and it was ascertained that the precipitation and gelatinous appearance stood in direct relation to the quantity of sugar present. Submitted to quantitative analysis, this precipitate was found to have the following composition: Insoluble in water, 6.66; quinine phosphate, 44.53; ac. phosphor. (pure) 13.33; sugar, 35.48. The author recommends that where Easton's syrup finds a ready use, the original formula (as published in Aitken's "Science and Practice of Medicine," Vol. II.) should be adhered to; but that where it is not in so frequent demand the formula of the "Extra Pharmacopœia" (Martindale's formula) be used; but that the quantity of sugar directed in the latter (37.5 per cent.) be reduced at least 10 per cent., in order that it may brave a northern winter with impunity. The following table shows the composition of a fluid drachm of each of the three syrups under discussion, namely: Easton's, Martindale's, and the gelatinous sample—

	Easton.	Martindale.	Gelatinous Sample.
Quinine phosph.	1.0	1.0	1.0
$Fe_2(PO_4)_2$	1.0	1.0	1.0
Total P_2O_5	4.04	4.0	4.1
Sugar	35.0	37.5	42.0
Water	28.4	26.4	23.0

—Yearbook of Pharm., 1889, 380–387.

TINCTURÆ.

Tinctures—Methods of Identification.—The following tests for determining the identity of certain tinctures are proposed by L. von Itallie:

Tincture of Aloes.—If this tincture be agitated with ether, and to the separated ethereal solution water of ammonia added, a red-violet coloration results.

Tincture of Calumba.—The yellowish-green residue obtained by evaporating a little of the tincture is dissolved in dilute hydrochloric acid, and if to this solution is added a small quantity of chlorine or bromine water, a light-red color is produced.

Tincture of Cinchona.—Two grams are precipitated by solution of lead subacetate, filtered, evaporated, the residue dissolved in water, a few drops of sulphuric acid added, and again filtered. The filtrate is tested for quinine or quinidine by the thalleioquin test.

Tincture of Colchicum.—Three grams are evaporated, the residue dissolved in water, the solution filtered, the filtrate agitated with chloroform, and the chloroformic solution evaporated; the residue with nitric acid, will be colored violet, changing to brown, on addition of potassium hydrate solution, becoming orange colored.

Tincture of Digitalis.—Five grams are evaporated, 2 c.c. water added, and precipitated with a small quantity of solution of lead acetate. After filtering the filtrate is agitated with chloroform, and to the residue, after the chloroformic solution has evaporated, is added a little sulphuric acid and a few drops of bromine water; a violet coloration appears.

Tincture of Gelsemium.—One gram is evaporated, 1 c.c. acidulated water added, filtered, the filtrate rendered alkaline with water of ammonia, and shaken with chloroform. Gelsemine remains upon evaporation of the chloroformic solution, which, with sulphuric acid and potassium bichromate, yields a red-violet color. The alkaline solution (after the removal of the chloroform solution), diluted with water, possesses a blue fluorescence.

Tincture of Guaiac is colored blue by oxidizing agents; a blue color is also obtained upon addition of cupric sulphate and bitter almond water.

Tincture of Ipecac is evaporated, the residue taken up with acidulated water, filtered, made alkaline with potassium hydrate solution, and shaken with ether. The residue from the ethereal solution gives a brown color, with a solution of ammonium molybdate in concentrated sulphuric acid, and upon the *immediate* addition of a drop of hydrochloric acid, a blue color soon appears.

Tincture of Jalap yields a residue turning red with sulphuric acid.

Tincture of Nux Vomica, evaporated with dilute sulphuric acid, gives a violet color; the residue treated with water, filtered, the filtrate made alkaline and extracted with chloroform, leaves a purified residue upon the evaporation of the chloroform, which, with nitric acid, is colored red, or with concentrated sulphuric acid and potassium bichromate, assumes a violet color.

Tincture of Quebracho, 5 grams are evaporated, the residue dissolved in acidulated water, filtered, rendered alkaline with potassium hydrate and agitated with chloroform; the chloroform residue is colored blue by sulphuric acid and potassium bichromate, or a red color is produced by boiling with dilute sulphuric acid and adding potassium chlorate.—Rundschau, 1889, 714.

Tincture of Kino.—The causes of gelatinization and precautions necessary to assure its prevention are given by I. H. Maiden in his paper on *Eucalyptus Kino*, which see under "Materia Medica."

Tinctura Gentianæ Composita—Experiments with Menstruums of Different Strengths.—Oliver B. Jacobs recommends that compound tincture of gentian be prepared with a menstruum of alcohol 3 parts and water 1 part, when it will remain permanently clear. Using alcohol 2 parts to water 1 part, the tincture showed a slight precipitate in two weeks. Made with strong alcohol, the tincture was less bitter in taste, and contained about 3.12 per cent. of solid matter, while the tincture made with the menstruum suggested yielded 5 per cent. of extract.—Amer. Jour. Pharm., Sept. 1889, 467.

Tincture of Ginger—Variation in Extractive from Different Parcels of Root.—J. W. Culbertson made tincture of ginger from 10 different parcels of ginger root, under identical conditions, and determined the amount of substance held in solution. He obtained 3.2, 6.2, 2.8, 5.6, 3.8, 3.4, 6.0, 4.6, 5.0 and 3.6 per cent. of residue of evaporation, thus showing that there is a remarkable difference in the quantity of extractive matter, soluble in the officinal menstruum, in different parcels of the drug. Under these conditions he considers it desirable that tincture of ginger, like tincture of nux vomica, should officinally be made to represent a definite amount of extractive.—West. Drugg., March 1890, 86; from Proc. Iowa Phar. Asso., 1889.

Soluble Essence of Ginger—Improved Process.—W. H. McGrath communicates the following working formula for a soluble essence of ginger, which combines the following essentials:

(1) That the "essence" should be as strong as possible compatible with its solubility.

(2) That it should possess the fine aroma peculiar to Jamaica ginger.

(3) That it should be perfectly free from capsicum.

Take of

Ginger, in coarse powder	1 lb. 8 oz.
S. V. R. (60 per cent.)	2 pints 5 oz.
Water	15 "
	3 pints.

These are to be frequently shaken together for ten days, then percolated pressed off, and filtered, yielding 45 fl. oz. This is "not to be made up" to 60 fl. oz., but worked from as it stands. Take of the above tincture 40 fl. oz., water 40 fl. oz. and mix; ¾ oz. phosphate of soda, dissolved in 5 oz. boiling water and allowed to cool, is next added, shaking the mixture; ¼ oz. fused chloride of calcium dissolved in 5 oz. nearly cold water, and added; the whole to be again well shaken; allow to stand twelve hours and filter. Introduce the filtered solution into a still and distil off, at a very low temperature, 30 fl. oz. first, which put on one side in bottle for further use. Distil then a further quantity of 40 fl. oz., and allow the still to cool. The residue in the still, which will be about 18 fl. oz., is what we require. This must now be carefully got out by rinsing the still with the 30 oz. first drawn over. This takes up all that is essential. Filter once more through double-paper filter, and the product is 40 fl. oz. of a fine amber-colored essence almost entirely soluble in water.—Chem. and Drugg., Feb. 15, 1890, 221.

Paregoric—Pharmaceutical Assay.—August Drescher recommends the following method for the assay of paregoric: A standard sample having first been prepared in strict conformity with the U. S. P., the *acidity* is first determined by diluting 20 c.c. of the sample under examination with 20 c.c. of diluted alcohol, and titrating with $\frac{1}{10}\,n$ NaHO, using phenolphthalein as indicator. Standard paregoric, U. S. P., 1880, will consume 7-8.5 c.c. of $\frac{1}{10}\,n$ NaHO under these conditions. The *sp. gr.* of officinal paregoric is approximately 0.925 to 0.935. The *morphiometric assay* is impracticable. The *meconic acid determination* is best carried out as follows with fair results: Evaporate 20 c.c. of sample on water-bath with 1 gm. freshly ignited kaolin to 10 c.c., filter, dilute filtrate with water to 20 cc., add 3 drops 10 per cent. ferric chloride solution, and compare coloration with that of the standard equally treated. The *examination for foreign colors* may be omitted in case the sample has a color fairly above the regular light-brown sample, in which event it ought to be condemned. Caramel, red santal, cochineal are commonly employed; cudbear rarely. Solution of basic lead acetate precipitates cochineal, santal and cudbear. The precipitate may be freed from lead by means of dilute sulphuric acid, and the color taken up by a suitable solvent, and further tested. Caramel is best precipitated by kaolin (freshly ignited), shaken out with water, and evaporated, or, the tincture may be directly evaporated down, and the caramel found in the residue, as a black or brown, viscid, sweetish mass, after washing with strong alcohol. Cochineal and caramel are insoluble in stronger ether, cudbear is slightly soluble, and santal-red is easily soluble. Caramel is insoluble in strong alcohol. The *amount of alcohol* is determined by diluting 50 c.c. with 100 c.c. of water, adding 3 grams of recently ignited kaolin, filtering in close funnel (to remove oil of anise, etc.), and distilling off 50 c.c.—Amer. Jour. Pharm., July 1889, 338–339.

Tincture of Musk, U. S. P.—Incomplete Extraction.—Geo. M. Beringer criticizes the U. S. P. formula for tincture of musk. He considers the amount of menstruum used to be insufficient to exhaust the musk, and that the process is consequently extravagant and wasteful of this expensive drug. In an experiment he found 1 gram of musk, treated by the officinal process, to yield 20 per cent. of extractive. The residue, again treated with the same amount of menstruum, yielded quite a strong tincture, containing over 6 per cent. of extractive, and a third maceration yielded a tincture still containing a considerable amount of odorous matter. He suggests that a strength of eight grains to the fluid ounce, with diluted alcohol as a menstruum, be adopted, which yields a tincture nearly identical in strength with that of the German Pharmacopœia.—Amer. Jour. Pharm., April 1890, 167–168.

Ethereal Tincture of Capsicum—Medicinal Use.—Dr. Sir J. Sawyer recommends a tincture of capsicum made with officinal pure ether instead of rectified spirit, as a local application in cases of subacute gout, chronic gout, chronic articular rheumatism, muscular rheumatism, and some cases of bronchial catarrh and chronic bronchitis. He believes that ether, by its action on the sebaceous secretion of the skin, is preferable to alcohol as a menstruum for drugs designed to produce a therapeutic effect on or through the skin. It has also the advantage that oil of turpentine or a bland oil is easily miscible with it, if requisite to add either. He states that a mixture of equal parts of ethereal tincture of capsicum, liquor ammoniæ, oleum terebinthinæ and oleum lini forms an excellent rubefacient liniment. The ethereal tincture can be applied on spongio-piline.—Pharm. Jour. and Trans., May 31, 1890, 979; from Lancet, May 17, 1890, 1066.

Tincture of Strophanthus—Modification of the Formula of the National Formulary.—Dr. E. R. Squibb calls attention to the inefficiency of strong alcohol to completely extract strophanthus seeds, and recommends a weaker menstruum (2 p. alcohol, 1 p. water), containing about 62 per cent. of absolute alcohol, such having a specific gravity 0.8914 at 15.6° C. The proportions also should be accommodated so as to correspond with the British preparation, viz.: 1 oz. avoir. of the perfectly dry seeds to 20 fl. ozs., Imp. measure of finished tincture. This, when transposed to parts by weight, corresponds to 5 parts in 84, whereas the preparation (of the National Formulary), as made in the United States, represents 5 parts in 100. As to what should constitute the prefectly dried seeds, the author suggests the extraction of the well dried seed, ground together with one-half its weight of glass, by ether. The residue is well dried, and its weight ascertained; the ether solution is distilled, the oil dried and weighed, and the weight of the two portions, minus the weight of the glass, is to be taken as the actual weight of seed employed. The tincture is then made by percolation with the menstruum named in the usual manner. It is of a bright yellowish wine color, has an odor suggestive of mustiness, and a rather persistently bitter taste. It is miscible in all proportions with water without producing cloudiness, and has a specific gravity of 0.8931 at 15.6° C. The commencing dose of this tincture is 5 to 10 minims, and a total quantity of 50 to 60 minims within any 24 hours is probably the limit of safety. —Ephemeris, July 1889, 1252–1255.

Tincture of Strophanthus—Formula Proposed for the Next Revision of the U. S. P.—George M. Beringer, referring to the above suggestions of Dr. Squibb, does not agree that it is necessary to base the weight of seed to be employed upon that found by adding together the weight of the fixed oil extracted and the weight of the well-dried extracted seed. He also does not agree that it is necessary to conform the relation of seed to tincture absolutely to that adopted in England, nor that so weak an alcohol as that proposed by Dr. Squibb is desirable, since a considerable amount of albuminous matter is dissolved by the weaker menstruum. As to the use of ether for extracting the oil, there is danger that more or less of the glucoside (strophanthin) is dissolved by that solvent, and the product weakened in proportion. He concludes by recommending for the consideration of the Committee on Revision of the U. S. P., the following formula, which in his opinion produces a satisfactory preparation:

Take of
Strophanthus seeds, ground to a number 40 powder and dried
at a temperature of 110 to 120° F. . . . . 1 troy ounce.
Benzin,
Alcohol,
Water . . . . of each a sufficient quantity to make twenty fluid ounces.

Pack the ground drug tightly in a cylindrical percolator and pour on benzin until the powder is saturated and the liquid begins to drop from the percolator, close the lower orifice, and leaving a layer of an inch or more of the liquid above the powder, tightly cover the percolator and allow to macerate for twenty-four hours; then slowly percolate with the benzin until a few drops of the percolate evaporated from a watch-glass leave no oily residue. Then remove from the percolator, dry, and if necessary again reduce to powder, moisten with a small portion of a menstruum of seven volumes of alcohol and one volume of water, repack lightly in the percolator and pour on menstruum, leaving an inch or two of supernatant liquid; cover the percolator and close the lower orifice and allow it to macerate for forty-eight hours, then percolate slowly, adding gradually menstruum of the above composition until twenty fluidounces are obtained.

If it be thought desirable to maintain the present system of percentage strength for tinctures, the amount of finished product would be altered to twenty troy ounces.—American Jour. Pharm., Sept. 1889, 454–458.

Tincture of Senna, B. P.—Inefficacy—B. S. Proctor calls attention to the inefficacy of tincture of senna, proof spirit being an unsuitable menstruum, inasmuch as it fails to extract the purgative principle. In the course of the discussion which followed, he expresses the opinion that the tincture might be replaced by a preparation made by macerating the senna with water, expressing strongly, and adding to the infusion enough alcohol to throw down the mucilage, but insufficient to precipitate the active principle,—Yearbook of Pharm., 1889, 353–359.

Tincture of Senna—Criticisms on Mr. Proctor's Conclusions.—Several correspondents of the "Chem. and Drugg." (Sept. 28, 1889, 478) criticize the conclusions of Mr. Proctor respecting tincture of senna. To J. F. Brown, who disclaims any intention of questioning the value of Mr. Proctor's experiments, it still seems a little premature to condemn as inert a preparation of such respectable antiquity on the basis of so limited an inquiry; while S. Phillips took an ounce of freshly prepared tincture of senna, B. P., made from Tinnevelly senna, with results that enable him to testify to its being an effective purgative, without griping.

Tincture of Lemon Peel, B. P.—Improved Formula.—William Johnston proposes that the B. P. formula for tincture of lemon peel be altered to the following:

R.	**Fresh lemon peel, grated**	**5 ounces.**
	Proof spirit	**2 pints.**

Macerate for seven days, in a closed vessel, with occasional agitation; strain, press and filter; then add sufficient proof spirit to make one pint. The peel should be obtained directly from the lemons by rasping the yellow portion directly into the spirit, afterwards thinly paring off the spongy portion saturated with oil, and adding the parings to the spirit.

Tincture of Orange Peel may be made in the same way.—Yearbook of Pharm., 1889, 497.

Tinctura Scopolæ—Preparation.— F. Ransom proposes a tincture of scopola to be made from the liquid extract of scopola (which see) as follows: Liquid extract of scopola, 4 fl. oz.; proof spirit, 21 fl. oz. Contains $\frac{1}{25}$ gr. of alkaloid in 100 fluid grains.—Amer. Jour. Pharm., Feb. 1890; from Pharm. Jour. and Trans., Dec. 14, 1889, 466.

Tincture of Solanum Carolinense—Preparation from the Berries, and Uses.—See *Solanum Carolinense* under "Materia Medica."

Tinctura Quininæ Ammoniata—Improved Formula.—George Lunan has made the observation that quinine is readily dissolved in carbonic acid water, and applies his observation to the preparation of tinctura quininæ ammoniata, which, when made with carbonate of ammonium, makes a clearer solution with a smaller quantity of ordinary water—and in all proportions with aerated water—than when it is made in the usual way. The formula is as follows: Carbonate of ammonia (32.5 per cent. NH_3), 323 grains; quinine sulphate, 160 grains; distilled water, rectified spirit, of each 10 fluidounces. Dissolve the carbonate in the water, the quinine in the spirit, mix, shake until dissolved, filter, and make the product to measure 1 pint with distilled water.—Phar. Jour. and Trans., March 29, 1890, 794.

Tincture of Chloride of Iron—Advice to Return to the Formula of 1860.—Dr. E. R. Squibb considers it to have been a mistake to change the formula for tincture of chloride of iron from that of 1860 to that of 1870 and 1880. The older formula directed a larger excess of nitric acid, which, by converting a portion of the alcohol into ether, imparts to the 1860 tincture a pleasant mellowness and softness that is absent in the tinctures of 1870 and 1880. He therefore advises a return to the process of 1860.—Ephemeris, July 1889, 1246–1248.

Tincture of Citro-Chloride of Iron, N. F.—Error in Formula.—F. B. Wells calls attention to an error in the formula for tincture of citro-chloride of iron, N. F., which is evidently due to a transposition of the quantities of citric acid and sodium bicarbonate. These, for 16 fluidounces, should properly be 2735 grains of the acid and 3282 grains of the bicarbonate. The quantity of water to be used for this solution should be 5 fl.oz., and not 7 fl.oz., the latter quantity being in excess of the quantity required to make 16 fl.oz.—Amer. Drugg., July 1889, 124.

UNGUENTA.

Ointments—Substitutes for Lard.—The following substitutes for lard in ointments are given in "Pharm. Ztg." (1889, 745): (1) Lanolin 65 parts, paraffin oil 30 parts, and ceresin 5 parts. (2) Anhydrous lanolin 35 parts, vaselin 53 parts, white ceresin 7 parts, and distilled water 5 parts. The latter preparation is known as "Unguentum medicinale" or "Adipatum," and is useful in preparing stock ointments (rancidity being impossible) or in making ointments containing silver nitrate or potassium permanganate.

Vaselin Ointments—Emulsification.—V. Krebs advises the use of castor oil as an emulsifying agent in ointments composed of vaselin and an aqueous preparation. Two drops of the oil should be used for each gram of the liquid to be mixed, this being sufficient to produce a perfectly homogeneous product. The only disadvantage of the use of the vaselins being thus overcome, their employment may become largely generalized, especially in the making of ointments with the iodide of potassium, whose tendency to decomposition is soon manifested with other fat substances.—Amer. Jour. Pharm., Nov. 1889, 559; from J. d. Phar. et de Chim., Oct. 1, 1889.

Unguentum Lanolini—Preparation.—H. Helbing observes that the inconvenient stickiness of lanolin is overcome by converting it into an ointment as follows: 65 parts of anhydrous lanolin, 30 parts of liquid paraffin, and 5 parts of ceresin, are melted together, and 30 parts of water beaten into the mixture.—Pharm. Jour. and Trans., Dec. 21, 1889, 496.

Lanolin Ointment—Improved Formula.—H. Helbing reviews the recent literature regarding lanolin, which is growing in esteem. He suggests that the formula for unguentum lanolini (see above) may be simplified by the substitution of vaselin for the liquid paraffin and ceresin, so that the composition would be:

Lanolin	3 oz.
Vaselin	1 "

M.

The "lanolin" which he recommends for officinal adoption is a yellowish-white, fatty substance, 10 grams of which dried on a water-bath must not lose more than 3 grams weight.—Chem. and Drugg., June 28, 1890, 867; from Helbing's "Record."

Boroglycerin Cream—Formula.—E. Dieterich gives the following formula for a boroglyceride-cream: 1.0 boric acid is dissolved with the aid of heat in 24.0 glycerin, and allowed to cool. 5.0 anhydrous lanolin and 70.0 paraffin ointment are melted together, colored by addition of 0.01 alkannin, the boroglycerin added, stirred to creamy consistence, and perfumed with one drop each of oils of rose and bergamot.—Amer. Jour. Pharm., May 1890, 248; from Pharm. Centralhalle, 1890, 158.

Cucumber Cream—Formula.—A. Zimmerman prepares cucumber cream as follows: 1 ounce each of wax and spermaceti and 1 pound (avoir.) of lard are made into an ointment; 6 fair-sized peeled and sliced cucumbers and 160 grains of borax are mixed intimately with it, allowed to stand 10 hours, then melted carefully, immediately strained, refrigerated on ice, the watery portion poured off, and then 160 grains more of borax incorporated with the fatty mass.—Pharm. Rec., Dec. 1889, 381.

Cold Cream—Use of Arachis Oil.—Maercker recommends cold cream to be made from arachis oil instead of almond oil. Four parts of white wax, 5 parts cetaceum and 28 parts arachis oil are melted on a water-bath, and to the partially cooled mixture are added 4 parts more of arachis oil with constant stirring, finally incorporating 16 parts rose water, in which ⅙ part borax is dissolved. To every 50 grams of the cold ointment one drop oil of rose is added.—Pharm. Ztg., 1890, 121.

Unguentum Scopolæ—Preparation.—F. Ransom proposes an ointment of scopola to be made from the alcoholic extract of scopola (which see) as follows: Alcoholic extract of scopola, 1 oz.; Benzoinated lard, 9 oz. Contains $\frac{1}{5}$ per cent. of alkaloid.—Amer. Jour. Phar., Feb. 1890; from Pharm. Jour. and Trans., Dec. 14, 1889, 466.

Sulphuric Acid Ointment—Remedial Value.—P. Vigier learned that an ointment peddled by a charlatan was giving surprisingly good results in sciatica, swollen articulations of rheumatic origin, etc. Procuring some of the preparation, he analyzed it, and found it to contain sulphuric acid, 1 part; lard, 7 parts. Vigier made some of it for distribution. The reports were very favorable. It caused considerable redness, but no blistering. The pain seems to have been relieved in all cases.—Amer. Jour. Pharm., March 1890, 134.

Zinc Ointment—Preparation with Mucilage of Tragacanth.—P. Vigier proposes the following as a homogeneous and unalterable preparation: Vaselin, 30 gm.; oxide of zinc, 4 gm.; gum tragacanth, pulv., 2 gm.; distilled water, 10 gm.; tincture of benzoin, 30 drops; powdered soap, 25 cgm. The oxide of zinc should be triturated in a mortar with the vaseline and added to the tragacanth mucilage previously prepared in another mortar. The soap is then introduced, and finally the tincture. It should be kept in closed jars.—Amer. Jour. Phar., Nov. 1889, 561; from Bull. Soc. de Pharm. de Paris, July 3, 1889.

Ointment of Iodide of Potassium—Addition of Medicinal Soap.—In place of some of the more recent additions to this ointment, made in order to prevent decomposition, E. Dieterich proposes again an older suggestion, namely, the addition of medicinal soap. The formula requires 10 parts potassium iodide and 1 part powdered soap to be dissolved in 9 parts of distilled water, and this solution incorporated with 80 parts of a firm paraffin ointment.—Amer. Jour. Pharm., Jan. 1890, 17; from Pharm. Centralh., 1889, 677.

Unguentum Hydrargyri—Use of Different Amalgams to Promote the Extinction of the Mercury.—Jacquemaire's recommendation (see Proceedings 1889, 421,) for the rapid preparation of mercurial ointment has induced D. B. Bowman to experiment with different amalgams in comparison with the process of the present Pharmacopœia, by which the extinction of the mercury is facilitated by trituration with compound tincture of benzoin and a little mercurial ointment. Working by this process the globules of mercury became invisible to the naked eye in ten minutes, and the ointment was finished in thirty minutes. The amalgams were prepared in the proportion of 1000 mercury to 1 K, Na, Zn, Sn or Mg; and were triturated directly with the fats and in separate experiments with the tincture and ointment, as stated. The amalgams with K or Na combined with the fats with difficulty and in part only, the mercury finally separating partly. The Sn amalgam combined better, and after an hour's trituration showed no globules visible to the eye; while the zinc amalgam was not completely extinguished. Using Mg amalgam the ointment was finished in fifteen minutes. On triturating the amalgams with tincture and ointment, as directed by the United States Pharmacopœia, the ointment was finished, using Sn, in fifteen minutes; while the globules became invisible to the eye in ten minutes with Zn; in fifteen minutes with K; in thirty minutes with Mg, and in two hours with Na.—Amer. Jour. Pharm., Sept. 1889, 466.

Unguentum Hydrargyri Nitratis—Improved Formula.—Adolph W. Borchers, as the result of a number of experiments with different oils and fats as bases for citrine ointment, recommends the following formula:

Neatsfoot oil	3 oz. 5 drachms troy.
Vaselin	4 drachms "
Nitric acid	420 grains.
Mercury	180 grains.

Mix the oil and the vaselin, heat in a water-bath to 200° F., at which temperature add the mercury, previously dissolved in the acid and slightly warmed. Stir occasionally until the reaction is completed, then allow it to cool until it begins to thicken, but not permitting it to get cold. Transfer to a mortar and triturate briskly until it becomes very light in color. The ointment so made retains its color and consistence for a long time.—Pharm. Rec., May 5, 1890, 176.

Ointment of Nitrate of Mercury.—H. Van Etta communicates the results of experiments with various animal fats and mixtures of the same used in the preparation of ointment of nitrate of mercury. He tabulates his results as follows:

With	Gives Ointment.
Lard,	Light yellow, very hard.
" and sperm oil (68 and 8),	" " firm.
" " " (60–16),	" " soft.
" and neatsfoot oil (68–8),	" " rather hard.
" " " " (60–16),	" " hard.
Sperm oil,	Almost white, very soft, did not harden.
Neatsfoot oil,	Dark yellow, granular.
Lard oil (1st sample),	Light amber, soft.
" " (3d sample),	Dark " "
" " (2d sample),	Amber, firm.

The lard used in these investigations was prepared as follows:

Pure leaf lard was obtained, the outer membrane and bloody portions removed, cut into fine pieces and passed through an Enterprise fruit press to destroy the cellular structure. It was then rendered by heating at a temperature not above 50 C. (122°F.), and strained through muslin. The product was firm and very white. To obtain lard of a reliable quality, the pharmacist should render it himself. On the basis of his observations the author submits the following formula for an elegant preparation, of light color and firm consistency:

Mercury	7 parts.
Nitric acid	17 "
Sperm oil	8 "
Lard	68 "

Mix the lard and oil and proceed according to the U. S. P. A softer ointment results from increase of the quantity of the oil; a harder, from increasing amount of the lard.—Pharm. Era, Nov. 1889, 414; from Proc. Mich. Pharm. Assoc., 1889.

VINA.

Medicated Wines—Various Formulas.—Dieterich communicates the following formulas for medicated wines:

CASCARA SAGRADA WINE.

White gelatin, in strips	15 grains.
Distilled water	2½ drachms.

Dissolve by the aid of heat, and add to—

Sherry wine	28 oz.

Shake well, set aside for some time, then add—

Tasteless fluid extract of cascara sagrada	1½ oz.
Sugar	1½ "

Set aside in a cool place for eight days, and filter.

A similar wine, not free from the bitter principle of the bark, may be made by macerating 1½ oz. of cascara sagrada and 1½ oz. of sugar in 30 oz. of sherry, for eight days, and filtering. A *Rhamnus frangula* wine can be made in the same way.

CINCHONA WINE.

White gelatin	15 grains.
Distilled water	2½ drachms.
Sherry wine	18 oz.

Detannate in the manner directed above; then add—

Simple syrup	6 oz.
Tincture of cinchona	6 "

After eight days, filter.

May also be made with red wine, or direct from the bark, the quantities being:

Gelatin	15 grains.
Distilled water	2½ drachms.
Sherry wine	30 oz.
Cinchona bark, in coarse powder	10 drachms.
Sugar	1½ oz.

Macerate for eight days, and filter.

In this case, care must be taken to have the gelatine and wine reaction complete before adding the cinchona, otherwise the alkaloid may be thrown out by the tannin of the wine.

IMPROVED QUININE WINE.

Gelatin	15 grains.
Distilled water	2½ drachms.

Dissolve, and add to—

Sherry wine	29½ oz.

Shake, and set aside to clear, then add the following solution:

Hydrochlorate of quinine	30 grains.
Dilute hydrochloric acid	30 drops.
Water	½ oz.

After a week, filter.

This is double the strength given by the author.

PEPSIN WINE.

White gelatin, in strips.	15 grains.
Distilled water	2½ drachms.
White wine	25 oz.

Detannate as described. At the same time mix together—

Pepsin	7 drachms.
Glycerin	6 "
Distilled water	6 "

Add to the wine along with 40 minims of hydrochloric acid; macerate for eight days, shaking occasionally; then filter.

SENNA WINE.

Alexandrian senna leaves	1½ oz.
Sherry wine	27 "

Macerate for eight days, press and strain; then add 5 grains of gelatin, dissolved in 2½ drachms of distilled water, and then the following:

Tincture of orange peel	1 oz.
" ginger	½ "
Aromatic tincture	80 minims.
Honey	2 oz.

Again allow to stand for ten days, and filter.

This wine is an excellent aperient for persons suffering from hæmorrhoids. It should be taken in tablespoonfuls, according to the effect desired.—Chem. and Drugg., June 21, 1890, 837; from Dieterich's Pharm. Manual.

Ipecacuanha Wine—Preparation from Standardized Fluid Extract.—J. O. Braithwaite and J. C. Umney propose the preparation of Ipecacuanha Wine from a fluid extract which has been standardized and prepared by a modified process suggested by them (see under "Fluid Extracts.") One fluid part of the fluid extract is mixed with sufficient sherry wine to make twenty fluid parts, the mixture allowed to stand 48 hours and then filtered. A slight deposit, which had formed after standing some weeks, though containing some distinct crystals with much amorphous matter, proved to be free from emetine, the crystals being cane sugar. In a special paper the authors communicate an assay process, which is essentially that proposed by them for the assay of the fluid extract (which see). The authors find that while the process of the present B. P. extracts practically all the alkaloid from the root, a considerable amount of the alkaloid so extracted is lost by the drying and powdering of the acetic extract, in consequence of which the wine produced is far inferior in relative alkaloidal strength to the root from which it is prepared, although undoubtedly a more "elegant" preparation than that of the 1867 Edition. Respecting the

Assay Process with Mayer's Solution, Mr. T. P. Blunt suggests a modification of the present method of assaying the wine for alkaloid by means of Mayer's solution. It consists in adding a saturated solution of mercuric chloride in potassium chloride in excess to the wine previously evaporated to remove the alcohol, and then, after filtering, taking the quantity of a centinormal solution of mercuric chloride that can be added to the filtrate before a permanent precipitate is produced, as the measure of the quantity of mercuric chloride that has been removed from the originally saturated solution by combination with the alkaloid.—Yearbook of Pharm., 1889, 393–397 and 397–402.

Wine of Beef and Iron—Method for its Examination.—E. G. Eberhardt communicates a method for the examination of wine of beef and iron. He observes that much of the so-called beef, iron and wine is of uniformly poor quality, while the remainder is perhaps as good as the existing conditions and the exacting palate of the consumer will permit. Leaving aside the question of its nutritive value, we will consider the matter from a pharmaceutical point of view. The claim of the larger manufacturers is that in each fluid ounce are contained 4 grains of citrate of iron and ammonium and the equivalent of 2 ounces of fresh beef, dissolved in a good quality of sherry wine. The price at which the article is sometimes sold warrants the suspicion that in many instances a very cheap wine is used. As to the extract of beef, Hager states that 10.0 of extract and 250.0 of fresh beef are considered equivalent, and on this basis the fluid ounce then should contain about 38 grains of the extract. In making the preparation, we find that the latter is not completely soluble in the wine, and on standing, precipitation continues for a considerable length of time. A manufacturer may thus send out a quantity in good condition, but by the time it reaches the dispenser or consumer it contains an unsightly precipitate. To obviate this, some seem to adopt the very radical and economical method of leaving out the beef. Others put in as much as they safely can, and bravely face any complaints, or again it is stored away until precipitation ceases before being put upon the market. After giving the details of his method, and a tabular statement of results, with a number of commercial samples, the author sums up the essentials of a method for the examination of wine of beef and iron as follows:

1. Note physical properties, color, odor, taste.
2. Determine the percentage of alcohol.
3. Determine total solid constituents.
4. Incinerate a portion and determine the amount of ash.
5. Estimate the amount of ferric oxide present.
6. Precipitate a portion by alcohol and estimate the percentage of solids precipitated and their ash.
7. Make an estimation of nitrogen.

A wine of beef and iron of standard quality should contain from 12–16 per cent. of alcohol, 10 per cent. and upwards (not exceeding 12) of extractive, yield about 2 per cent. of ash, .2 per cent. of Fe_2O_3, and from .5–.75 of nitrogen. About one-half of the solids and two-thirds of the ash should be found in the portion precipitated by alcohol. Any sample yielding much less than 1 per cent. of ash and .15 per cent. of nitrogen can be safely put down as containing very little beef.—Amer. Jour. Pharm., Feb. 1890, 80–85.

Creasote Wine—Formula.—Better prepares creasote wine by mixing glycerite of creasote (see "Glycerites") 30, water 30, and syrup 20, with white wine, 40 p.—Ztschr. Œster. Apoth. Ver., 1890, 138.

FORMULAS AND MISCELLANEOUS MATTER.

Antiseptic Ligatures—Preparation.—Edward Q. Thornton prepares antiseptic ligatures from E and A violin strings (catgut) as follows: The catgut is wrapped loosely upon glass spools, and then kept in ether for 24 hours. Remove the spools from the ether, pass a glass rod through them, and allow the ether to evaporate, avoiding contact with anything. When dry, cover with a 1 per cent. solution of mercuric chloride in diluted alcohol; after half an hour remove from the mercuric solution, and wipe the catgut with a towel that had previously been washed out of a 0.1 per cent. solution of mercuric chloride in water. The catgut is preserved in a bottle under oil of juniper, and should remain in the oil for at least ten days before it is used.—Amer. Jour. Pharm., April 1890, 170.

Surgical Gauze—Quick Method of Preparation.—H. Helbing gives some general information respecting surgical gauzes, and the following quick method of preparing them: Take the necessary quantity of raw material (gauze), weigh out the corresponding amount of antiseptic, and dissolve this in ether or a mixture of alcohol and ether, using 3 ounces of the liquid for 1 ounce of raw material. The latter is saturated with the liquid, wrung out, again saturated so as to insure uniform impregnation, then unfolded and shaken a few times, when it will be found dry enough for immediate use. In this manner all the different gauzes may be prepared—carbolic, corrosive sublimate, iodoform, thymol, eucalyptol, or any other.—Pharm. Jour. and Trans., Dec. 21, 1889, 495.

Protective Gauze Tissue—Preparation and Uses.—Dr. Renton describes a new form of gauze protective tissue, contrived with a view to "ensure the gauze or other dressings not sticking to the wound and still allow any discharge to be absorbed through it." It is made by stretching "coarse pale book muslin" on frames and soaking it with a mixture of isinglass, glycerin, water, aniline solution, bichloride of mercury solution (1 in 4000) and chloride of ammonium. When dry it is permanent and antiseptic. In using it a strip, the length of the wound and an inch in width, is cut and dipped into a tepid solution of bichloride of mercury (1 in 2000) and then applied over the wound, with the ordinary dressings above. Complete absorption of any discharge is said to be allowed, whilst sufficient dissolved isinglass remains as a coating over the wound to secure non-adherence of the tissue and thus enable the surgeon to remove the dressings without causing pain. Pharm. Journ. and Trans., June 28, 1890, 1060; from Brit. Med. Jour., June 14, 1890, 1367.

Iodinated Muslin—Preparation.—Taking advantage of the property possessed by cellulose of fixing iodine, which is afterward set free under the influence of gentle heat, Méhu lately proposed a method of making "iodinated squares" to be applied in the same way as ordinary sinapisms of paper impregnated with the oil of mustard. The iodinated muslin is said to have certain advantages over applications of tincture of iodine, apart from its convenience. It acts more evenly, there is less irritation or blistering, and the desired effect may be longer continued. In preparing the muslin, Breaudat and Cathelineau have improved upon Méhu's process. They first place the fabric for a few minutes in a 2 to 100 solution of bi-carbonate of soda. They then press and wash it and let it remain for half an hour in a 4 to 100 solution of chloride of lime. Then it is again washed until no alkaline reaction is observed, when it is plunged into a 5 to 100 solution of hydrochloric acid for a quarter of an hour, after which time the acid is washed out and the muslin carefully dried. The cloth is now fitted to retain the iodine vapors. The iodine, finely pulverized, is spread evenly upon both sides of the fabric, which is then loosely rolled and introduced into a jar. The latter is warmed until vapors begin to arise, when it is sealed and placed in a water-bath for two hours at 212° F. On cooling, the muslin is put away in glass jars for use.—Amer. Jour. Phar., Feb. 1890, 93–94; from Répert. de Phar., Dec. 10, 1889.

Iodine Paper—A Permanent Article for Topical Use.—Eymonnet recommends a permanent form of iodine paper for topical application, for which he uses paper free from size which he saturates with iodide of potassium, and another paper similarly treated with iodate of potassium and tartaric acid. These papers, separated by a very thin sheet of plain paper, are then brought together with gutta-percha fasteners and enclosed in a thin sheet of gutta-percha. Plasters thus made will keep indefinitely, and the iodine does not appear until the paper is immersed in water. On application, iodine is disengaged from the paper during about forty-five minutes. The amount disengaged is about thirty cgm. for each leaf. The author states that an application of these leaves for forty or fifty minutes produces better effects than can be had by five or six hours application of iodized cotton, or five or six paintings with the tincture. The plasters do not burn the skin and are tolerated for from half an hour to an hour. When necessary they may be covered with gutta-percha, and the clothing thus be protected.—Amer. Jour. Pharm., Aug. 1889, 415; from Bull. du Synd. de la Côte d' Or, through L' Union Pharm.

Mercurial Flannel—A Substitute for the Ointment.—Prof. Merget, believing that mercury cannot be absorbed by the healthy skin, and that mercury inunctions act only through the respiratory organs, which absorb their vapor, proposes the use of mercurialized flannels to replace the inconvenient ointments now employed, and Carles explains how these should be prepared. Thick, soft flannels should be first relieved of fatty matters by soaking for three hours in a 25 per cent. solution of bicarbonate of soda, after which they are lightly wrung out and plunged into clear water. After a second wringing, made gently—with the object of retaining a portion of the alkaline salt—they are placed for four or five hours in a saturated solution of nitrate of mercury. As strong vapors are thus disengaged, the process should be carried on under a chimney of some sort. The flannels should then be lightly soaked in a 1 to 2 solution of liquor ammoniæ, and, when a grayish cast shall have been obtained upon them, should be dried in a shaded place in the open air. They are then beaten, to remove the metallic particles, and put away in glass-stoppered bottles. In using, a square of 25 centimetres is placed upon the chest, or at night in a small, open bag upon the patient's pillow within the influence of the respiratory organs. These flannels give off mercurial vapors for years, but the dose gets too weak for therapeutic purposes in about three weeks, when they should be renewed. They are eligible for use against *pediculi pubis* and other skin parasites.—Amer. Jour. Pharm., Dec. 1889, 611–612; from Rep. de Pharm., Oct. 1889.

Phenolated Pyroxylin or Celluloid—A New Surgical Dressing.—Desesquelle calls attention to the fact that a variety of phenolated celluloids may be prepared from gun-cotton, and that these may be made useful for surgical dressings and for many laboratory purposes. A clear, hard and strongly adhesive varnish is made by soaking pyroxylin in camphorated phenol, while stirring, and spreading it on a plane surface until the camphor evaporates.—Amer. Jour. Pharm., Nov. 1889, 559; from Rep. de Pharm., Aug. 1889.

Disinfectant Pastilles—Formula.—According to "D. Med. Ztg." a convenient disinfectant is made by forming into pastilles, paraffin 9.5; iodine, 1.0, and salicylic acid 2.0. These pastilles are burnt in the rooms to be disinfected or deodorized; the products of the combustion contain iodine and carbolic acid, upon which their value depends.—Oesterr. Ztschr. f. Pharm., 1889, 622.

Antiseptic Sponges—Preparation.—The following method for preparing antiseptic sponges is given in "Bull. Soc. de Pharm. de Bordeaux:" The mineral matter near the stem should be carefully removed and the sponges thoroughly beaten with mallets and washed in running water. They should then be placed for six hours in a bath composed of: Hydrochloric acid, 10 gm.; water, 1 litre. Now wash thoroughly in water and soak again for six hours in a solution of: Permanganate of potash, 1 gm.; water, 1 litre. Wash again and place for two hours in a mixture of: Solution of bi-sulphate of soda, 10 gm.; hydrochloric acid, 1 gm.; water, 1 litre. The sponges (now of a yellowish-white color) should be again washed and put by for use in a solution composed as follows: Phenic acid, 1 gm.; alcohol, 5 gm.; water, 1 litre. If the odor of phenic acid is objectionable, the sponges may be preserved in the following solution: Thymol, 1 gm.; alcohol, 4 gm.; water, 1 litre.—Amer. Jour. Pharm., Sept. 1889, 473.

Artificial Nutrients—Review of Composition.—Dr. Frederick Hoffmann reviews the artificial nutrients that are in current use in the United States at the present time, and gives a table showing the constituents and composition of such as have been analyzed by different experimenters, to which reference may be had in Pharm. Rundsch., Sept. 1889, 217–218.

Fromentin—A New Alimentary Substance from Wheat.—According to the "Lancet" a new alimentary substance, called fromentin, consists of the embryo of the wheat reduced to flour, and is stated to contain three times more nitrogenous substance than meat, and a strong proportion of sugar. Hence it would appear that it might advantageously replace powdered meat as a concentrated food. It may be employed for making soups, and even for making biscuits, the taste of which would not be disagreeable.—Amer. Jour. Pharm., July 1889, 361.

Scraped Beef—Palatable Form.—Dr. Carles, having observed that many patients soon contract a repugnance for scraped beef, found by experiment that if the pulp be first mixed with a little beef soup and afterward with a small quantity of pea or lentil soup, and heated gently in a water-bath, the unpleasant taste and odor pass wholly away. The mass should be passed through a hair sieve before heating.—Amer. Jour. Pharm., Sept. 1889, 473; Nouv. Rem., June 24, 1889.

Tooth-Ache Paste—Formula.—The following formula for a tooth-ache paste is given in Rev. de Thérap., 1889: A resinous acid, 1.0 gm.; cocaine hydrochloride, 1.0 gm.; menthol, 0.2 gm.; glycerin, a sufficient quantity.—Amer. Jour. Pharm., April 1890, 172.

Disinfectant Dentifrice—Formula.— Prota-Giurleo gives the following formula for preparing an efficient dentifrice and mouth wash: Alcohol of 40 per cent., 500; camphor, 10; salicylic acid, 20; benzoin, 50; clove stalks, 100; hypochlorite of lime, 50; essence of anise, 20; glycerin, 500. All of the substances except the hypochlorite and anise are placed in a strong, closed flask which is subjected in a water-bath to 60° C. of heat for five hours, agitating occasionally. After macerating for eight days and filtering, the hypochlorite is added, when a further maceration of eight days is given, when the anis is added and the preparation is finally filtered. The liquid should be put up in small blue or yellow phials. This preparation perfumes the mouth, whitens the teeth and frees the adherent tartar. It also hardens the gums and arrests gingival hemorrhages. For a mouth-wash two teaspoonfuls are added to a quart of water.—Amer. Jour. Pharm., Dec. 1889, 612; from Farm. Ital., through Rép. de Pharm., Oct. 1889.

Tooth Paste for Cleansing Discolored Teeth—Preparation.—According to "Oester. Zeitschr. f. Pharm." (1889, 304), a *tooth cleanser* for discolored teeth is prepared by making a stiff paste of powdered cuttle-fish bone with a four per cent. solution of hydrogen peroxide. Apply by rubbing over the teeth and after a few minutes rinse with plenty of water. The teeth are cleansed in a few minutes without injury to the enamel.

Prophylactic Mouth Washes—Formulas.—Dr. Monte gives two formulas for prophylactic mouth washes:

Borated Mouth Wash consists of boric acid, 2.5; distilled water, 250; tincture of myrrh, 3 parts.

Salicylated Mouth Wash is made with sodium salicylate, 3; distilled water, 250; tincture of myrrh, 3 parts.—Amer. Jour. Pharm., April 1890, 172; from D. Med. Wochenschr., 1889.

Depilatory—An Efficient Formula.—According to "Pharm. Centralhalle" an effective depilatory is made by mixing 2 parts of barium sulphide with 1 part of starch and 1 part of oxide of zinc. The barium sulphide can be made fresh, as required, by mixing powdered barium sulphate with its own weight of charcoal, making into a stiff paste with linseed oil, and forming the mass into a roll like a sausage, which is to be placed in the fire until deflagration is complete. After cooling the mass is to be powdered, and mixed with the starch and oxide of zinc. The depilatory is to be made into a paste with water before use, spread on the skin, and allowed to remain for ten minutes. The success of depilatories greatly depends upon the freshness of the sulphide employed.—Chem. and Drugg., March 15, 1890, 347.

Black Ink—Formula for a Superior Article.—According to "Industrie Blätter," a superior black ink, which is not affected by water or acids, is made by mixing warm solutions of potassium bichromate and gelatin, exposing to sunlight for one-half hour, adding a solution of nigrosin in water, filtering, and finally adding a few drops of creasote.—Pharm. Post, 1889, 877.

Type-writer Ink—Use of Castor Oil for Dissolving the Aniline Pigment.—Shuttleworth has made the observation that many of the salts of the aniline series are soluble in castor oil; methyl-violet is especially so, and advantage can be taken of this fact to prepare a type-writer ink of remarkable power, admitting of a large number of copies being taken from the same impression. Nigrosine was not experimented with, but it would seem possible that with it a black ink of some intensity might be produced. The incorporation and solution of the aniline in the oil can be effected on the small scale by triturating the previously powdered pigment with the oil in a mortar, the operation being sometimes facilitated by the addition of a little alcohol. Various colored inks for stamping pads might be produced in the same way, though it has not yet been determined whether such mixtures would exercise a deleterious influence on the rubber stamp.—Phar. Jour. and Trans., March 1, 1890; from Canad. Phar. Jour., Jan. 1890, 81.

Microscopical Examination of Powders.—Hans M. Wilder gives explicit directions for the microscopical examination of powders, which will be found of practical value, and may be consulted in Amer. Jour. Pharm., June 1890, 278–281.

Administration of Powders.—A substitute for Wafers, Cachets, etc. See *Japanese Paper* (from *Wickstrœmia canescens*) under "Materia Medica."

MATERIA MEDICA.

A. Vegetable Drugs.

GENERAL SUBJECTS.

Indigenous Remedial Plants.—Professor John M. Maisch calls attention to a number of indigenous plants that have recently been the subject of discussion before the Georgia Pharmaceutical Association. The list embraces:

Solanum Carolinense, Michaux, commonly known as "horse nettle," the berries and root of which have been used, as tinctures, in epilepsy.

Rhamnus Purshiana, De Candolle, (the bark) and

Helonias dioica, Pursh. (the rhizome), are recommended by H. R. Slack, Jr., for pharmacopœial recognition. The latter, which is now known by its botanical name,

Chamælirium luteum, Gray, is stated to be a tonic, emmenagogue, and a corrector of all the secretions of the glandular system. A tincture (1 : 16 dil. alcohol) is recommended, and given in 2½ drachm doses.

Atropa Belladonna, *Jateorrhiza Calumba*, *Rhamnus Frangula*, and *Gentiana lutea*, all of which are exotic plants, are enumerated by J. R. Gregory among others as being profitably collected in Georgia. Prof. Maisch observes that he believes belladonna to be the only plant which is cultivated in the United States to a limited extent; and since none of the species have been naturalized here, it becomes of interest to learn whether some indigenous plants are known in some parts of Georgia by names similar to those used for the above officinal drugs, or are similar in appearance to the plants yielding the latter.—Amer. Jour. Pharm., Nov. 1889, 552–554.

Useful Brazilian Plants.—In continuation of his former papers (see Proceedings, 1889, 427–428), Dr. Theodor Peckolt describes the following useful Brazilian plants: *Elæis guinensis*, Linné; *Elæis melanococca*, Gaertn.; *Euterpe oleracea*, Mart.; *Euterpe edulis*, Mart.; *Euterpe precatoria*, Mart.; *Euterpe catinga*, Wallace; *Œnocarpus distichus*, Mart.; *Œnocarpus tarampabo*, Mart.; *Œnocarpus Bataua*, Mart.; *Œnocarpus* *bacaba*, Mart.; *Œnocarpus multicaulis*, Spruce; *Œnocarpus minor*, Mart.; *Oreodoxa oleracea*, Mart.; *Geonoma maxima*, Kunth.; *Geonoma fiscellaria*, Mart.; *Geonoma Pohliana*, Mart.; *Geonoma platycaula*, Dr. et Trl.; *Geonoma trinervis*, Dr. et Wendl.; *Geonoma leptospadi*, Trail.; *Geonoma Camana*, Trail.; *Geonoma acaulis*, Mart.; *Geonoma brevispatha*, Barb. Rodrig.; *Calyptronoma robusta*, Trail.; *Leopoldinia Piassaba*, Wallace; *Leopoldinia pulchra*, Mart.; *Leopoldinia major*, Wallace; *Manicaria saccifera*, Gaertn.; *Hyospathe elegans*, Mart.; *Kunthia montana*, H. et B.; *Iriartea ventricosa*, Mart.; *Iriartea exorhiza*, Mart.; *Iriartea setigera*, Mart.; *Copernicia cerifera*, Mart.; *Trithrinax brasiliensis*, Mart.; *Trithrinax schizophylla*, Dr.; *Acanthorrhiza Chuco*, Dr.—Pharm. Rundsch., July 1889, 165–167; Aug. 1889, 191–195; Nov. 1889, 261–266.

Medicinal Plants of the Argentine Republic.—A correspondent of the "Brit. and Colon. Drugg." gives an account of some of the crude drugs exhibited at the recent Exposition in Paris by the Argentine Republic, which attracted attention not only by their great variety, but also on account of the excellent manner in which they were presented. Among these drugs the following are enumerated:

Relbunium hirtum (Schumacher), of the family Rubiaceæ, called by the natives "Cangai;" an herb used against acute rheumatism. Found in abundance.

Equisetum species, family Equisetaceæ, of which the native name is "Cola de Caballo;" a diuretic and astringent plant, used in cases of gonorrhœa and diarrhœa. Very scarce.

Petiveria alliacea, of the family Phytolaccaceæ, native name "Guinė ȯ Pipi;" a plant of which the root is used as a febrifuge, and against rheumatism, hydrophobia, snake-bites, etc. Rather common.

Stachytarpha dichotoma, of the family Verbenaceæ, named by the natives "Yerbon o Menstruz;" a common plant, used as a tonic, and in bronchitis, coughs, convulsions, colic, paralysis, contusions, etc.

Peperomia species, of the genus Piperaceæ, the common name of which is "Yatebû-caá;" a febrifuge and a tonic. Found in abundance.

Scirpus capillaris, of the order Cyperaceæ, native name "Espartillo;" recommended for pulmonary affections. Found very frequently.

Calopogonium cœruleum, of the order Leguminosæ, by the natives called "Cumanda viray;" an abundant herb, employed as an aperient febrifuge.

Hyptis species, belonging to to the order Labiatæ, known amongst the common people as "Ovechá-caá;" found rather frequently, and used in the treatment of syphilis.

Begonia cucullata, a member of the family Begoniaceæ, known amongst the inhabitants as "Agrial"; possessing antiscorbutic diuretic and antiphlogistic properties, and employed against catarrhal affections and against inflammation and irritation of the urinary passages. Often met with.

Tagetes glandulifera (Schrk). of the order Synanthereæ, the native name of which is "Zuico" or "Chinchilla"; a scarce herb, with tonic qualities.

Cuphea species, belonging to the family Lytharieæ, called in the country "Icipo-peré"; a common herb, used as a purgative, diuretic, and a purifier of the blood.

Rhynchosia diversifolia (Mich.), a member of the order Leguminosæ, the vulgar denomination of which is "Urizuheé"; an expectorant, and a remedy for spasmodic coughs.

Cuscuta species, of the family Convolvulaceæ, by the natives named "Cabello de Angel," or "Icipo Chumbo"; a parasitical plant, with gently laxative, diuretic, and antiphlogistic properties, used in the form of an infusion for intermittent fevers, congestion of the respiratory organs, and in the shape of a tea in cases of hæmoptysis, inflammation of the throat, and internal abscesses. It is not very common.

Chenopodium anthelminticum, of the family Chenopodiaceæ, called by the natives "Yerba de Santa Maria," or "Caané"; an herb of which an infusion in the shape of a tea has digestive, slightly stimulating, and diaphoretic properties. It is also used as a remedy for hysterical fits, indigestion, catarrh of the stomach, dysentery, pleurisy, asthma, and especially for paralysis of the tongue.

Ocotea (*Strychnodaphne*) *suaveolens*, one of the Laurieæ, in the vernacular "Laurel blanco," or "Canela molle"; a tree of which the leaves are recommended for their diuretic and carminative properties, and are also used as an emmenagogue.

Acanthospermum xanthioides, a member of the tribe of Synanthereæ, vernacular name of which is "Aganabicho;" a common antisyphilitic herb, also prescribed for gonorrhœa. The root is an intense narcotic.

Baccharis articulata, of the family Synanthereæ, the common appellation of which is "Carqueja;" an herb found abundantly, and useful against indigestion, sterility, etc.

Crotalaria incana, belonging to the order "Leguminosæ," and called by the natives "Yerba de Toro;" a common tonic herb, makes an excellent tea, is very aromatic, much used for stomach-ache, and produces a rich perfume.

Senecio albicaulis, of the family Synanthereæ, known in the country as "Yerba Mercurial;" an herb little met with, possessing qualities of a purifying, diaphoretic, antifebrile, and pectoral nature.

Discaria longispina, Miers, one of the species Rhamneæ, of which the native name is "Quina del Campo;" a scarce bush covered with spines, of which the roots have antifebrile properties.

Anchietea salutaris, a plant of the family Violaceæ, called amongst the people "Cipo-zumo," and frequently found; has various purgative and antisyphilitic virtues.

Echites longiflora, of the genus Apocinæ, in the common tongue "Yalapa;" a plant used as a purgative, and in a powdered condition employed in plasters. Also made into an infusion.

Julocroton Montevidensis, Klotz, classed among the Euphorbiaceæ, and called by the natives "Velamen;" is a somewhat rare herb, prescribed in cases of syphilis and syphilitic rheumatism.—Amer. Drugg., Nov. 1889, 204–205.

Medicinal Plants—Cultivation in Jamaica.—The director of the Jamaica public gardens and plantations, in his annual report for 1888, which has just been issued, observes that in cool places, under the shade of bananas,

Nutmegs thrive well in Jamaica. The trees bear heavy crops, but the fruit is small.

Cacao does remarkably well along with the nutmegs, and the trees also bear heavy crops of fine pods. A sample of cacao was cured at the Hope gardens in May last, and forwarded to Mr. Bravo, chocolate manufacturer, Kingston, who pronounced it equal to cacao which he imports from Venezuela. Mr. Bravo manufactured the sample into chocolate, and exhibited it at the Kingston flower and horticultural show held in June, and competent judges declared it not inferior to the best chocolate imported from France.

Cinnamon grows luxuriantly at Hope. The young trees were raised from seeds obtained from plants of one of the best varieties brought from Ceylon, therefore they can be recommended. It appears, like the mango, there are numerous varieties of cinnamon, many of which are of little value. The

Kola Nut grows fairly well, but has not yet fruited. The gardens supply seeds, when in season, for persons, wishing to take up the cultivation of this plant.

Cardamoms are not a success at the Hope gardens, the plant thriving best in moist, shady situations from 1,500 to 3,000 feet above sea level; but

Vanilla, as might be expected, grows and flowers freely. The plantations of

Tea have received careful attention. A small amount of tea manufactured at the gardens was submitted to a firm of tea brokers in London, whose report was of a very favorable character. There are three areas under cultivation, one at Latimer, where the plant is perfectly naturalized, one at Upper Buzza, and one below the garden. In future it is proposed only to cultivate the latter area to supply from time to time leaf for experimental manufacture. The other plantations will supply a sufficient number of plants for those who wish to experiment with the growth in different parts of the island. From the Blue Mountain ridge down almost to the sea-coast on the north side, the conditions are favorable to the growth of tea; extensive planting is not recommended anywhere in Jamaica, so long as labor is scarce. Tea is made only from the very young leaves, which burst out all over the bush once in two, three, or four weeks, according to the season. It these leaves are not picked at once they grow too large for manufacture. It is thus necessary on a tea plantation to have an abundance of cheap labor available at an hour's notice.—Chem. and Drugg., Aug. 10, 1889, 219.

Medicinal Plants — Cultivation in Cambridgeshire (*Eng*). — E. M. Holmes communicates an interesting paper on the cultivation of *Aconite*, *Henbane*, *Belladonna* and *Foxglove*, near Foxton, Cambridgeshire, which see in Amer. Jour. Pharm., Oct. 1889, 510–512; from Pharm. Jour. and Trans., Aug. 27, 1889, 122–123.

Leaves—Medicinal Uses.—P. L. Simmonds, remarking upon the economic uses of every portion of various plants, gives a brief summary of the medicinal uses, etc., to which the foliage of various plants is put. The list comprises a very large number of plants, and may be conveniently referred to in Amer. Jour. Pharm., April 1890, 193–197.

FUNGI.

Lactarius piperatus—Constituents.—In continuation of an investigation of the fatty constituents of fungi, Gérard has separated from *Lactarius piperatus* oleic and stearic acids, partly free and partly as glycerides, as well as a considerable quantity of lecithine, and formic, butyric and acetic acids. The most interesting constituent observed was a cholesterin which appeared to be identical with the ergosterin separated a short time since by Tanret from the fat of ergot.—Pharm. Jour. and Trans., March 29, 1890, 792; from Jour. de Pharm. et de Chim., March 1, 1890, 279.

LICHENES.

Cetraria Islandica—Chemical Characters of Constituents.—A. Hilger and O Buchner use the following methods for isolating *lichenstearic* and *cetraric acids* from *Cetraria Islandica.*

Lichenstearic Acid.—The lichen, reduced to a coarse powder, is completely extracted with petroleum ether and this recovered. The dried residue is stirred into boiling water, and to the boiling mixture sodium bicarbonate added in small quantities, so that a part of the residue remains undissolved. The solution, while hot, is filtered and supersaturated with hydrochloric acid. The precipitate is pressed between bibulous paper and recrystallized from petroleum ether, using animal charcoal for decolorizing. Further purification is accomplished by crystallizing from boiling alcohol. The acid is a white voluminous mass, consisting partly of small prisms, which, however, soon fall into glossy leaflets, melts at 120° C., soluble in alcohol, chloroform, ether, benzol, petroleum ether, and nearly insoluble in water. By combustion and analysis of the silver, barium and lead salts and of the chloride, the composition $C_{43}H_{76}O_{13}$ was determined for lichenstearic acid.

Cetraric Acid was obtained by Knop and Schnedemann's method, by boiling the Iceland moss for a quarter of an hour with alcohol and potassium carbonate, precipitating with hydrochloric acid, extracting with petroleum ether, and treating the residue to remove coloring matter with equal volumes of ether and turpentine. The acid was not obtained in a crystalline form, but as a white bitter powder, barely soluble in water, soluble in alcohol, and difficultly soluble in ether and petroleum ether. The melting point could not be obtained, as the acid decomposes below 200° C. A combustion and analysis of silver and barium salts give the formula $C_{30}H_{30}O_{12}$, and, like the above acid, show it to be dibasic.—Amer. Jour. Pharm., June 1890, 297; from Ber. d. Deutsch. Chem. Ges., 1890, 461.

LYCOPODIACEÆ.

Lycopodium—Examination of the Fixed Oil.—A. Bukowski has examined oil of lycopodium, and obtained results which differ very materially from those gotten by A. Langer (see Proceedings, 1889, 430–431.) The author attributes this to the latter working with some very old lycopodium in which the oil had become rancid. Personally gathered spores were extracted, after trituration, with ether; the yield was 48.50 per cent. of an odorless oil resembling almond oil in color and consistency; specific gravity 0.925 at 18°; does not solidify at—22°; is optically inactive; is non-drying; easily soluble in ether, *glacial acetic acid*, *petroleum ether*, chloroform, oil of turpentine, benzol and hot alcohol, difficultly soluble in cold alcohol and in amyl alcohol. Contains the following constituents in approximate quantities: *Phytosterin*, $C_{25}H_{42}O$, 0.3 per cent.; *lycopodic acid* $C_{18}H_{36}O_4$, 2 per cent., this acid is isomeric but not identical with dioxystearic acid, melts at 90—92° C., solidifies at 87—84°, forms a lead salt insoluble in ether but rendered soluble by the presence of oleate of lead; *oleic acid*, 80 per cent.; *arachidic, stearic and palmitic acids*, 3 per cent; glycerin, 8.2 per cent.—Pharm. Ztschr. f. Russl., 1889, 359.

Lycopodium—Composition of Fixed Oil.—In a former paper (see Proceedings 1889, 430–431), Dr. Alfons Langer gave the results of his examination of lycopodium, and, among other constituents, described the fixed oil, which he found to contain a large percentage (from 80 to 86.67 per cent.) of a peculiar oleic acid, the constitution of which he designated as

α-Decyl-β-isopropylacrylic Acid.—The paper of Bukowski appeared about the same time in the Russian language, and he also describes the fixed oil, but gives as the principal constituent of the oil simply oleic acid (see above). Inasmuch as Bukowski based his examination upon oil ob-

tained from perfectly fresh sporules collected in the Woronesch government, while Langer obtained his fixed oil from commercial lycopodium, the latter has now made further experiments in this direction, which confirm his previous view that the constitution of lycopodium-oleic acid differs from that of ordinary oleic acid. Its empirical formula is $C_{16}H_{30}O_2$, and it corresponds in its constitution to α-Decyl-β-isopropylacrylic acid. When treated with melting caustic potassa and soda, it yields butyric, acetic and laurinic acid. Oleic acid, under the same conditions, yields acetic and palmitic acid.—Arch. d. Pharm., July 1889, 625–628.

FILICES.

Adiantum lunulatum—Medicinal Use in India.—According to E. M. Holmes this *Adiantum* is used by the Mahometans of India as a substitute for the ordinary maiden-hair of Europe, and is employed as a deobstruent and resolvent.—Pharm. Jour. and Trans., Feb. 15, 1890, 660.

CHARACEÆ.

Nitella Nordstettiana—A New British Plant.—H. and G. Groves describe and illustrate in "Journal of Botany" a new British species of Nitella, *N. Nordstettiana*, which is one of the smallest species of the genus, and is allied to *N. tenuissima*, from which it differs in the prominent winglike ridges of the oospore, the surface of which is minutely warty, so that it presents a wrinkled appearance. It produces its fruits usually at the first forking of the branches, which is exceptional in *N. tenuissima;* the internodes also are shorter in proportion, and the end-cells of the branchlets more sharply pointed.—Pharm. Jour. and Trans., March 29, 1890, 793.

CYPERACEÆ.

Kyllingia monocephala—Use as an Antidote to Poison in India.—E. M. Holmes states that this little Cyperaceous plant is given as an antidote to poison. It possesses aromatic properties.—Phar. Jour. and Tran., Feb. 15, 1890, 660.

GRAMINACEÆ.

Andropogon odoratus—A New Species.—At a recent meeting of the Natural History Society of Bombay, Mrs. J. C. Lisboa read a paper on this subject. Mrs. Lisboa gave interesting notes on the six known species of *Andropogon* which grow in India and Ceylon, and the most important of which, from a commercial point of view, are *A. Nardus* Linn. (the source of citronella oil), *A. citratus*, which yields lemon-grass oil, and *A. Schœnanthus*, Linn. [*A. Martini*, Roxb.; *A. Pachnodes*, Trin.: *A. Nardoides*, Nees.; *A. Calamus Aromaticum*], which is named "ginger grass" by Europeans. The last is of all the *Andropogons* the best known, and is used for adulterating otto of rose in European Turkey. The author also describes a new species of *Andropogon*, which, as far as her knowledge and reading go, has not been described before. She has named it *A. odoratus*. It is known to the natives as *Gawat wedi*. Mrs. Lisboa came across it while arranging plants and dissecting spikelets of grasses for Dr. Lisboa.

Description.—Culm erect, 3–5 feet high, sometimes branching from the lower part, glabrous; nodes long bearded. Leaves lanceolate, cordate at the base, acute or acuminate, with a few long hairs; the lower cauline and radicle leaves long, the upper small, but their sheaths very long. Ligula small. Spikes numerous, erect, branched, pedicellate (the pedicel of the lower spikes longer), and congested at the end of a long peduncle without a sheathing bracht, and forming an erect, dense, ovoid panicle. The rachis, pedicel, and the spikes covered with long silky hairs. Spikelets nearly two lines long, of a purple color, the sessile and the pedicellate nearly similar; outer glume of the sessile spikelet rather thin, many-nerved, somewhat obtuse, and covered with long silky hairs, with a pit in some spikelets of the same plant, and absent in others; second glume as long as the first or a little longer, but broader, thin, and keeled; third glume thinner and hyaline; fourth glume smaller, or an awn ½ to 1 inch long, with an hermaphrodite flower at the end of the pedicel. Pedicel of the pedicellate spikelet covered with white hairs, but the spikelet almost free of hairs. Outer glume stiff, with five or more nerves, not prominent, almost obtuse; second glume thinner, with three nerves, somewhat broader, but as long as the first; third glume hyaline, smaller; fourth glume very small, hyaline or none; no awn; at the top of the pedicel three stamens not well formed, and not as large as in the hermaphrodite flower.

This grass is common at Lanowli on the right side of the station in the fields beyond the woods, where it grows along with *Pollinia tristachya*, Thw., *Ischæmum laxum*, R. Brown, *Arundinacea nepalensis*, Trin., and other annual grasses. The purple-coloured spikes of *A. odoratus* and *Pollinia tristachya* congested at the end of long peduncles form a most elegant and beautiful feature of the scenery of the field towards the end of the rainy season. It is said to be not uncommon at Khardi, Tanna, and the specimen under notice was found in the collection received from this district.—Chem. and Drugg., Sept. 21, 1889, 405.

Spinifex Resin—Characters and Composition.—J. H. Maiden describes a sample of gum used by the Australian natives for cementing the heads of spears, and said to be prepared from "spinifex root." This is probably the root of

Triodia irritans, R. Br., but further information is necessary to decide this definitely. The resin is in form of a cake 4 inches in diameter, and 1¼ inch in thickness. The smell is something like beeswax, but has at the same time an exceedingly disagreeable and persistent odor, difficult to describe. Its color is dirty dark bronze, almost slaty, and in consistence it is exceedingly tough. Its composition is indicated by the following summary of the author's examination:

Fat, soluble in petroleum spirit	3.1
Resin, soluble in alcohol	67.3
Extractive and salts, soluble in water	6.9
Accidental impurity	23.1
	100.4

Alcohol dissolved from another portion 70.8 per cent.—Pharm. Jour. and Trans., June 7, 1890, 998.

ASPARAGINEÆ.

Sarsaparilla—Collection in Guatemala.—William T. Brigham describes the occurrence and collection of sarsaparilla in Guatemala as follows: One of the most troublesome vejucos, or vines, common all through the forests of the Atlantic seaboard, is the zarza, or sarsaparilla. Probably the American public is familiar with the popular remedies compounded in part with this valuable medicinal plant, which, belonging to the Smilax family, affects damp, warm forests, climbing to great heights over the trees. The portion used is the long, tough root; this the zarza gatherer digs and pulls from the loose soil, replanting the stem, which in due time replaces its stolen roots, to be again robbed. The roots are washed, loosely bundled, and sold to the dealers, who have the fibres made up into tight rolls, a few hundred of which are then pressed together and sewed up in the thickest hide that can be found; for the "custom of trade" includes the wrapper in the tare of the more costly drug. Most of the sarsaparilla exported from Belize comes from Guatemala and Honduras; but from Livingston more than 60,000 pounds were exported in 1884, of an appraised value of ten cents per pound. The plant is easily propagated by cuttings or seeds, and of course, needs no cultivation or cleaning; the yield will average 20 pounds of dried root from each plant.—Amer. Drugg., Nov. 1889, 212.

Jamaica Sarsaparilla—Botanical Source.—The uncertainty existing as to the species of Smilax which is cultivated in Jamaica has been somewhat cleared up recently by Sir Joseph Hooker, who has carefully gone over all the available information on the subject, and has just published his conclusions. While admitting the vagueness and uncertainty of the information possessed on the subject, Flückiger and Hanbury in the "Pharmacographia" incline to believe that the sarsaparilla cultivated in the island of Jamaica, though of a light brown color and more amylaceous than the Jamaica sarsaprilla of commerce, is botanically identical with it. Specimens of this cultivated plant, but without flowers or fruit, which were sent to Flückiger and Hanbury, and planted in the Botanical Gardens at Kew, some twenty years since, have quite recently flowered for the first time, and it is this occurrence which has attracted Sir Joseph Hooker's attention to the subject. The latter authority has, after an examination of these flowers and all the available information, concluded that the specimen in question is not the *Smilax officinalis* H. B. K., and has, therefore, described it anew under the name *Smilax ornata*, Hook. f., believing it to be probably identical with the *Smilax ornata*, Lemaire, described in "Illustrations Horticoles." The real difficulty which exists as to the placing of the specimens of Smilax in regard to their species lies in the fact that, the flowers being diœcious, it is necessary to obtain both a male and a female plant in order to be perfectly accurate in the description. The plant which flowered in the Kew Gardens proved to be a male, the female flowers being still unknown.—Amer. Drugg., Oct. 1889, 187; from Chem. and Drugg.

LILIACEÆ.

Musambra — A Variety of East Indian Aloes.— Writers on Indian materia medica have described in their works an impure aloes called *Musambra*, said to be made in India. David Hooper describes a specimen of aloes known as *Musambra*, and bought by him in Bangalore, but observes that the word is evidently applied to aloes in general, though most of the authorities, which are cited in his paper, appear to designate the most impure kinds of Indian aloes by the word *Musambra*. The specimen purchased by the author has the following characters. It occurs in thick cylindrical pieces of ½ lb. to 1 lb. or more. The color is black, and liver-colored in places where it is broken or rubbed. It breaks or crumbles up into small *angular* fragments, not into laminæ or splinters, as in other kinds of aloes. It is distinctly porous, and small stones and other impurities are seen to be imbedded in its substances. The odor is agreeably aromatic. The powder is dull umber brown. When moistened and examined under the microscope the crystals of aloin only slowly made their appearance, which would imply that there was a smaller quantity than usual of the active principle.

A proximate analysis of the drug gave the following result:

Water extract	53.8
Resin soluble in acetic acid	10.4
Resin insoluble in acetic acid	8.5
Insoluble in proof spirit	1.9
Mineral impurities	21.8
Moisture	3.6
	100.0

The drug responded to the general tests for aloes. Bornträger's test = a rose color, Cripps and Dymond's test = deep orange-red. Ditto with ammonia = claret. Nitric acid in the cold = deep red. Nitric acid vapor passed over some of the powder mixed with sulphuric acid gave no blue color. The last two tests are characteristic of Barbadoes aloes.

Some investigations respecting the botanical source of the aloes produced in India seem to point to *Aloe vulgaris*, Lamark, as the plant yielding it, and that *A. indica* and *A. litoralis*, mentioned in the Pharmacopœia of India, might be placed under the denomination of *A. vulgaris*, a plant which seems to be well established, at least in Southern India. *A. vulgaris* affords the Barbadoes aloes of commerce, which gives peculiar reactions with nitric acid and its vapour. The Mysore aloes, in giving similar reactions, confirms to some extent the evidence of its being made in the country from a plant which is so abundant. If the imported article should ever become scarce, the natives will not be backward in manufacturing the drug for themselves, if, indeed, this is not already done.—Pharm. Jour. and Tran., Aug. 17, 1889, 121–122.

Aloes—Specimens from the Dutch West Indies.—E. M. Holmes communicates the results of his investigations respecting two specimens of aloes from the Dutch West Indies recently presented to the Museum of the Br. Phar. Society by Prof. Van Eeden, one of which was stated to be the product of *Aloe vulgaris*, the other of *A. spicata*. Both, however, seemed extremely similar, both in odor and appearance, and it seemed to him doubtful that they should have been obtained from different species of *aloe*, the more particularly because in "Pharmacographia" the aloes produced in Curaçao is stated to be derived from *A. vulgaris*. Inquiry from Prof. Van Eeden elicited some very interesting information respecting the production of aloes in Curaçao, Aruba and Bonaire, to which reference must be had in the original paper. He states that *Aloe vulgaris* is the only kind cultivated; that *A. spicata* is very rare; and that *A. succotrina* had also been introduced some years ago, but has probably entirely disappeared. At the author's request, two specimens of aloes just received, as well as one from Aruba and another from Bonaire, sent still more recently by Professor Van Eeden, have been tested by Messrs. Bainbridge and Morrow, with the following results:

No. 1. "*Aloe vulgaris.*"—This specimen gave with nitric acid an evanescent crimson color and with sulphuric acid and the vapor of nitric acid a slight bluish-green tint; with Cripps and Dymond's test (see Proceedings 1885, 106), an orange red color, and on the addition of ammonia a claret color.

No. 2. "*Aloe spicata.*"—The reactions with this specimen were exactly identical with those given with No. 1.

No. 3. Aruba Aloes.—This specimen gave with nitric acid a permanent deep red, and with sulphuric acid and the vapor of nitric acid no reaction; with the Cripps and Dymond test a deep orange red, and on the addition of ammonia, a dark claret color.

Bromine water in sufficient quantity to form a paste gave a purplish-pink permanent coloration.

No. 4. Bonaire Aloes.—With this specimen nitric acid produced a permanent deep red color; with sulphuric acid and the vapor of nitric acid no reaction; with the Cripps and Dymond test a deep orange red, and on the addition of ammonia a dark red; bromine water gave a pinkish-brown tinge only.

If the reactions given by these samples be compared with those obtained by Messrs. Bainbridge and Morrow with aloe juice from authenticated plants (see below) the inference may be fairly drawn that Nos. 1 and 2 of Professor Van Eeden's specimens are identical, and that some mistake must have occurred in the packing; and that in the Aruba and Bonaire specimens the ordinary reactions for aloes derived from *Aloe vulgaris* have been modified to a greater or less extent by the introduction of *A. succotrina* and *A. spicata* into these islands.—Pharm. Jour. and Trans., Jan. 18, 1890, 561–562.

Aloes—Reactions Obtained with the Juice of Authenticated Plants, and their Value for Determining Commercial Sorts of Aloes.—J. Bainbridge and C. Morrow record the results of some highly interesting experiments made to determine the chemical reactions obtained with the juices of the leaves of different species of *Aloe*, growing in the Kew Gardens. The authors have used the ordinary tests (nitric acid, and sulphuric acid with nitric acid vapor), and the two tests proposed by Cripps and Dymond (see Proceedings, 1885, 106), together with a "bromine test" and a "ferric chloride test." The results are given in the following table:

Commercial Specimens.	HNO_3.	H_2SO_4 and vapor of HNO_3.	Cripps and Dymond.	C. and D. with NH_4HO.	Bromine Test.	Fe_2Cl_6
Aloes hepatic . .	reddish-brown	nil	orange-red	intense brownish-red	nil	All varieties of aloes give an olive-green coloration with the above reagent.
True socotrine .	reddish-brown	"	orange-red	intense brownish-red	"	
Commercial socotrine . .	faint crimson	"	crimson	deep claret	"	
Cape	permanent green after standing a few minutes	"	orange-red	pale claret	"	
Curaçao	evanescent crimson	"	crimson	intense claret	"	
Natal	permanent crimson	deep blue	deep crimson	intense brownish-red	"	
Barbadoes . . .	crimson soon fading	slight bluish-green occasionally	crimson	deep claret	"	
Kew Specimens.						
Aloe ferox . . .	evanescent crimson	green	pale yellow	red	violet	
—*Succotrina* .	permanent crimson	deep blue	crimson	intense brownish-red	deep purplish-red	
—*vera*	nil	slight green	—	—	nil	
—*Perryi* . . .	"	nil	—	—	"	
—*purpurascens*	crimson fading to light red	"	—	—	violet	
—*platylepis* . .	nil	"	—	—	nil	
—*arborescens*, . var *frutescens*	"	"	—	—	"	
—*Africana* . .	evanescent red changing after a few minutes to green	"	orange-red	pale claret	"	
—*Chinensis* . .	nil	"	—	—	"	

Without going into the details of the experiments and observations by which the authors arrive at their conclusions, and which may be profitably consulted in the original paper, their conclusions are given as follows:

1. That Cape aloes may be produced from *A. africana*, but chemical tests afford no evidence that it is obtained from the other species which have been stated to yield it.

2. That Natal aloes may be obtained from *A. succotrina*, but that chemical tests do not indicate that the other species whose inspissated juice was examined are likely to produce it.

3. That the aloes at present sold in commerce as Socotrine aloes is not obtained from *Aloe Perryi*, but probably from some variety of *Aloe vulgaris* or species allied to it; and

4. That the hepatic aloes of commerce is probably obtained from *Aloe Perryi*.—Pharm. Jour. and Trans., Jan. 18, 1890, 570–571.

Aloes—Detection in Fluid Extract of Cascara Sagrada.—The presence of aloes in fluid extract of cascara sagrada has been the subject of an investigation by Ludwig Reuter, who recommends Klunge's cupraloin reaction as the best means of detecting the adulteration; 10 to 20 drops of the extract are evaporated to dryness in a watch crystal, the residue mixed with cold water and the aqueous solution filtered; to the filtrate are first added a few drops of copper sulphate solution, then a little sodium chloride solution, and finally a few drops of alcohol, a violet-red coloration indicating the presence of aloes.—Pharm. Ztg., 1889, 745.

Scilla—Microscopic Examination.—C. Hartwich records the results of an interesting microscopical examination of the leaves and bulbs of squill, with reference, primarily, to the mucilage; and, secondarily, to the coloring matter. The mucilage is of two kinds, both as to chemical identity and distribution—the one kind occurring in form of large drops, filling the cells of the parenchym entirely, or nearly so; the other encloses raphid-bundles composed of calcium oxalate. The chemical distinctions of the two mucilages are given in a table. The coloring matter appears to be related to the "anthokyan" of Marquardt. The author's paper, which is illustrated by numerous cuts showing the microscopic structure of the various cells, cannot be further abstracted without going into greater detail than is contemplated by this report.—Arch. d. Pharm., July 1889, 577–588.

Royal Salep—Botanical Source.—Dr. J. E. T. Aitchison communicates a full account of the "badsha" or "royal salep," a substance largely used as food in some parts of Afghanistan. He has identified it as a species of allium, namely:

Allium Macleani—It is remarkable that although an *Allium*, it does not possess any alliaceous odor. It also presents a remarkable peculiarity in the fact that the innermost scale of the bulb is remarkably fleshy and forms the greater proportion of the bulb, only a few outer scales of a membranous character being present. It does not contain starch, but, as with salep, its properties are due to mucilage.—Pharm. Jour. and Trans., Sept. 28, 1889, 244; from Annals of Botany.

IRIDACEÆ.

Saffron—Adulterations.—G. M. Beringer has examined two samples of adulterated saffron. The first was of a handsome color, excellent in odor, and brought a very high price. It yielded on incineration 40 per cent. of ash. On close inspection it was found to be an admixture of vegetable fibre of unknown origin with a small quantity of genuine saffron. The fibre was in pieces from ½ inch to 1½ inches long, and upon microscopic examination proved to be the stem of a monocotyledon, most likely a species of grass. This was loaded with a calcium sulphate artificially colored, and attached thereto with some saccharine substance, most likely glucose. A small quantity thrown on water soon deposited a heavy precipitate of the sulphate, tinting the water a pinkish yellow. The sample contained only about 20 per cent. of genuine saffron. The adulterant yielded 52.7 per cent. of ash. The second lot of saffron was genuine Spanish saffron, excellent in color and odor, contaminated with but a small quantity of the yellow styles and a few stamens, but loaded with sodium sulphate. It yielded 17 per cent. of fusible ash.—Amer. Jour. Pharm., Dec. 1889, 607–608.

MUSCÆ.

Leptotrichum Glaucescens, Hpe.—Presence of A Crystalline Acid.—J. Amaun describes under the name of

Leptotrichic Acid the first example of a crystallizable product obtained from the Muscineæ. He produced it from *Leptotrichum glaucescens*, Hpe., the glaucous appearance of which moss is caused by a white scurfy coating which protects it from the action of water like a coating of wax. He finds this substance to be very soluble in ether, chloroform, or hot alcohol of 90 per cent. The concentrated solution in ether has an acid reaction, and the acid crystallizes out on evaporation in the form of prismatic needles. It is distinguished by its powerful resistance to concentrated sulphuric and hydrochloric acid, which scarcely affect it, nor is it attacked by caustic alkalies in the cold. The author finds this substance present in the green parts of the moss to the extent of 13 per cent. of its weight. No chemical formula is given.—Pharm. Jour. and Trans., July 6, 1889, 6.

AMOMEACEÆ.

Ginger—Examination of the Resin.—Robert Glenk has examined the resin separated by water from the fluid extract and mechanically adhering to the powdered pumice used for the clarification of the fluid. Extracted from the pumice with alcohol, on evaporation a semi-solid residue is left of a black color, and an odor slightly differing from that of the root. Its alcoholic solution is of an acid reaction. About two-thirds of the resin is soluble in solution of potassa, and the dissolved portion is reprecipitated on adding an excess of HCl. The portion insoluble in 5 per cent. KOH dissolves in glycerin on slightly warming, and is reprecipitated on diluting with warm water. It is almost insoluble in water of ammonia. Castor oil, ether, acetic ether, chloroform and acetone completely dissolve the resin; carbon disulphide, turpentine and petroleum benzin dissolve only partially. On adding a few drops of tincture of chloride of iron to a dilute alcoholic solution a gradual darkening in color results. In a solution in 5 per cent. KOH (1–10) on the addition of test solution of permanganate of potassium, a dark green color is produced which fades in half a minute. With HCl (1.160) no effect is produced. H_2SO_4, specific gravity 1.84, dissolves the resin with a black color; the solution is precipitated by the addition of water, and after washing with water the mass is almost insoluble in alcohol. HNO_3 (1.42) oxidizes the resin rapidly with copious evolution of red fumes, forming a straw-colored liquid, and separating a red waxy substance as a product of the oxidation. The solution separated from the waxy substance is rendered much darker in color (yellowish red), but the reaction for picric acid, which it was supposed to be, could not be confirmed. It loses 1½ per cent. on being heated in an air-bath to 110° C.—Amer. Jour. Pharm., Nov. 1889, 558–559.

THYMELACEÆ.

Japanese Paper—Use as a Substitute for Wafers in Medicine.—Dr. A. Hoffmann has added another to the methods at present in vogue for taking powders such as wafers, tablets, capsules; he recommends Japanese vegetable paper, in which the powder is wrapped and the whole swallowed. The source of the paper, according to Uloth, is

Wikstrœmia canescens, and the product is known in commerce as Usego. Hoffmann states the advantages of the material to be cheapness and easy digestibility.—Chem. and Drugg., May 24, 1890, 681.

LAURACEÆ.

Cinnamomum Cassia—Mode of Collecting the Bark.—J. Humphreys gives the following information respecting the collection of cassia bark by the Chinese: "Transverse cuts are made round the branch or stem, which is only of the size of one complete quill (viz., about an inch in diameter) at distances of about a foot. Then two longitudinal cuts are made right down the stem on each side. This is readily peeled off, and when thoroughly dried presents the appearance of the sample. The chopper-like knife is used for most of the work. The other, a kind of spokeshave, which resembles a plane in its action, is merely to shave off the corky layer or periderm." Mr. Humphreys is informed by the Chinese manager of his firm that by far the best cinnamon never gets to Europe, and grows wild in a place in Annam. He tells him that it differs altogether in appearance from Ceylon cinnamon, being in fact larger than cassia bark. The Chinese pay large sums for it. The curator of the Museum of the

Pharmaceutical Society of Great Britain, who communicates the above remarks of Mr. Humphreys, gives some additional information respecting cassia and cinnamon bark, to which reference may be had in Pharm. Jour. and Trans., Feb. 15, 1890, 658–659.

Cinnamon—Distinction between the Oils obtained from the Leaves, Bark and Root.—See *Cinnamon Oils*, under "Organic Chemistry."

POLYGONACEÆ.

Canaigre—A New and Cheap Tanning Material.—Prof. Henry Trimble communicates some experiments made with a root which has been heretofore noticed in the journals under the names of *Indian Root* and *Raiz del Indio*, and is now again introduced under the name "*canaigre root.*" It is found in large quantity in the sandy soil on both sides of the Rio Grande and northward over a large portion of western Texas and New Mexico, can be supplied very cheaply, and the different examinations made prove it to be an admirable tanning material. It appears to have been first noticed in 1868; was examined under the name of Raiz del Indio by R. Voelcker in 1876 (see Proceedings 1876, 131), who found it to contain 23.16 per cent. of tannin; in 1878 by F. Kalteyer (Report. Commiss. Agricult., 1878), who obtained 23.45 per cent. of tannin from the dry roots, and from the fresh roots a corresponding quantity, together with 18 per cent. of starch. In 1879 (Ibid, 1879) Wm. Saunders determined these roots to be derived from

Rumex Hymenosepalum, Torrey, thus correcting the erroneous supposition of Voelcker that the plant yielding it belonged to the Polygonaceæ. In 1886 Prof. Trimble had examined a root from San Antonio, Texas, under the name of "Indian Root," and published the results under the title "Yerba del Indio," (see Proceedings 1886, 381), from the impression that it was the *Aristolochia fœtida* of the Mexican Pharmacopœia; but the drug examined has since been determined to be the canaigre. Prof. Trimble found only 11.66 per cent. of tannin, but the root had become damaged by decay and insects. Recently he has examined a sample obtained in good condition, and found it to contain 17.33 per cent. of tannin; while Dr. H. E. Sturke (Shoe and Leath. Rep., Oct. 27, 1887), found a total of 28.57 per cent. of tannin. Prof. Trimble accounts for the smaller yield in his case on the ground that the drug examined by him contained more moisture. Further experiments are being made.

Canaigre consists of heavy globular and fusiform pieces from two to six inches long, and one to three inches in diameter. Externally it is of a dark, reddish-brown color, becoming, by age, almost black; internally it is from a bright to a brownish-yellow, according to age and amount of exposure to atmosphere. When collected the roots consist of clusters resembling sweet potatoes. They are found near the surface or sometimes on top of the ground, are rapidly dried and, at a certain stage, cut into small pieces. If allowed to get very dry they become so hard as to resist any ordinary method of cutting.—Amer. Jour. Phar., Aug. 1889, 395–397.

Rhubarb—Pharmaceutical Assay.—August Drescher recommends the following method for the assay of rhubarb. The *physical properties* are first noted and compared with a sample of undoubted quality, in the case of the powder best with a self-prepared sample. The *amount of extract* obtained with 45 per cent. (weight) alcohol should, according to Hager, be 47 per cent.; the author finds the minimum to be 35, and the maximum 58 per cent. The *ash* the author finds to range from 12–14 per cent., and is ascertained in the usual manner. The *chrysophanic acid*, which according to Hager should not be less than 3 per cent., or according to the author 2.5 per cent., may be determined by the method of Hager, of Schlossberger, or by the following method of the author, though none of them yield "pure chrysophanic acid:" Take 5 grams finely powdered rhubarb, 1.5 grams tartaric acid, mix thoroughly, introduce into a Tollens apparatus, and repercolate with 50 c.c. of chloroform at about 65–70° C., evaporate, take up with chloroform, evaporate and weigh as "chrysophanic acid." The presence of *foreign coloring matters* is easily detected, according to their nature (aniline, coal-tar derivatives, curcuma, etc.); thus: anilines (or other coal-tar derivatives) may be shaken out with benzol, or other solvents, etc. Curcuma is certainly discovered by the methods proposed by Maisch and Howie.—Amer. Jour. Pharm., July 1889, 339–340.

PHYTOLACCACEÆ.

Phytolacca decandra—Innocuous Character of the Juice.—Eymard states that in Spain and Portugal the berries of the elder and phytolacca are largely used for coloring wines and liqueurs, and that it is rare not to find a corner of the vineyard devoted to the cultivation of these plants. He has made some experiments with the juice of phytolacca, since the root of that plant is known to possess powerful medicinal properties, and the berries are stated to be a violent purgative. He finds, however, that the juice taken in the dose of 60 grams produced only one action of the bowels, and it required 80 grams to produce a cathartic action. The color of the juice is rendered more bright by acids, and turned to a bottle-green by alkalies. The extract of the berries is partly soluble only in alcohol of 60°, very slightly in alcohol of 80°, and in that of 95° almost insoluble. It is almost insoluble in ether, chloroform and bisulphide of carbon.—Pharm. Jour. and Trans., March 29, 1890, 792; from Jour. de Pharm. et de Chim., March 1, 1890, 243.

SCROPHULARIACEÆ.

Euphrasia officinalis, L.—Value as a Remedy in Coryza.—Dr. G. M. Garland recommends *Euphrasia officinalis, L.*, as a valuable remedy in coryza, it exerting a powerful action upon the recently-inflamed mucous membrane of the nose and pharynx, but it seems to be of no effect in nasal discharges which have advanced to a purulent or muco-purulent condition. Ten drops of the tincture were given in a little water every two hours. While works of reference, mentioning this drug, usually refer to its use in ophthalmic complaints, in which it had attained much celebrity in former centuries, the National Dispensatory states that it was also esteemed in toothache, and was given, as a distilled water or a tincture, in *chronic* catarrhs.—Amer. Jour. Pharm., April 1890, 179; see also Boston Med. and Surg. Jour., Nov. 7, 1889.

Herpestis Monniera—Medicinal Use in India.—Dutt states that this plant is considered to be a nervine tonic, and as such is useful in insanity and epilepsy. Ainslie says that it is diuretic and aperient, and is serviceable in cases of dysuria accompanied with constipation.—Pharm. Jour. and Trans., Feb. 15, 1890, 660.

Verbascum Thapsus—Proximate Examination of the Leaves.—Adolph Latin submitted the leaves of *Verbascum Thapsus* to proximate analysis and found the constituents to be .80 per cent. of a crystalline wax, a trace of volatile oil, .78 per cent. of resin soluble in ether, 1.00 per cent. of resin insoluble in ether, but soluble in absolute alcohol, a small quantity of tannin, a bitter principle, sugar, mucilage, and the other usual constituents. The moisture in the air-dried sample amounted to 5.90 per cent. and the ash to 12.60 per cent. He concludes that the plant contains many of the usual constituents, and a bitter principle which may be prepared by exhausting the drug with alcohol, evaporating or distilling the solvent, dissolving the residue in water and agitating with ether or chloroform. Several trials failed to secure this substance in a crystalline condition. It was found to be soluble in water, ether, alcohol and chloroform, and to possess a decidedly bitter taste. It responded to none of the tests for a glucoside or alkaloid.—Amer. Jour Phar., Feb. 1890, 71.

SOLANACEÆ.

Solanum tuberosum—Distinct Characters of the Amorphous and Crystalline Bases Contained in the Young Shoots.—R. Fibras has determined that the two products, the one crystalline and the other amorphous, obtained in the preparation of solanine from the young shoots of the potato, are now shown, contrary to earlier views, not to be chemically identical. The author names the crystalline compound

Solanine.—This has the formula $C_{52}H_{93}NO_{18}$, 4½ H_2O, and when dried at 100° appears to be anhydrous, or to contain only half a molecule of water of crystallization. From a solution in 85 per cent. alcohol, it crystallizes in colorless needles, which melt at 244°, are almost insoluble in ether and alcohol, and are readily dissolved by dilute hydrochloric acid; but by boiling with a 2 per cent. solution of hydrochloric acid, the solanine is converted into

Solanidine, and glucose is separated. Solanidine has the formula $C_{40}H_{61}NO_2$ or $C_{41}H_{65}NO_2$, and is obtained from alcoholic solution in amorphous masses interspersed with needles melting at 191°. It dissolves readily in hot alcohol, with difficulty in ether, and on treatment with excess of dilute sulphuric acid forms a sulphate, $3(C_{40}H_{61}NO_2,H_2SO_4)H_2SO_4 + 8H_2O$; this crystallizes in scaly plates melting at 247°, and is readily soluble in water. Its diacetyl-derivative, $C_{40}H_{59}O_2NAc_2$, crystallizes in needles melting at 203°. The amorphous substance obtained simultaneously with solanine, which the author names,

Solanëine, is also a glucoside and forms like the crystalline base solanidine and glucose. It differs however in its composition, which corresponds to the formula $C_{53}H_{87}NO_{13}$, or $C_{52}H_{83}NO_{13}$. The loss of weight on heating the air-dried compound at 100° corresponds with the formula $C_{52}H_{83}NO_{13} + 3\frac{3}{4}$ or $4H_2O$. It is a yellow, horny, perfectly amorphous substance, melting at 208°, is more soluble in an 85 per cent. solution of alcohol than is solanine. On treatment with hydrochloric acid it yields solanidine and a sugar in accordance with the equation $C_{52}H_{83}NO_{13} + H_2O = C_{40}H_{61}NO_2 + 2C_6H_{12}O_6$, while solanine yields solanidine and a sugar in accordance with the equation $C_{52}H_{93}NO_{18} = C_{40}H_{61}NO_2 + 2C_6H_{12}O_6 + 4H_2O$.—Amer. Jour. Pharm., June 1890, 302–303; from Monatshefte X., 541–560, through Jour. Chem. Soc., 1890, 75.

Solanum carolinense—Use of the Berries in Epilepsy.—Dr. J. L. Napier has used a 20 per cent. tincture of the berries of *Solanum carolinense* with advantage in his practice. The dose varied from 10 drops to a drachm, given until drowsiness was produced. In the case of a woman who had suffered most of her life from epilepsy, an apparent cure was effected by the administration of the tincture in tablespoonful doses three times a day.—Pharm. Jour. and Trans., March 1, 1890, 711; from Therap. Gaz., Jan. 1890, 71.

Jurubeba—Source and Medicinal Value.—Dr. Theodore Peckolt, referring to a recent examination by Dr. Kobert of a drug introduced by an American firm as the "jurubeba" of Brazilian reputation, and found by him to be inert, and containing neither glucoside nor alkaloid, remarks that the remedial agent known in Brazil as "jurubeba" is not *Solanum paniculatum*, L., to which Dr. Kobert and the American manufacturers refer it, but

Solanum insidiosum, Mart.—He observes that while an inert and useless drug might in Brazil, as in other countries, have a popular reputation among the people without possessing any intrinsic medicinal value, it is hardly to be expected that physicians should fall into the same error. Jurubeba being used in Brazil with undoubted good results by regular practitioners of medicine, it seems likely that if the experiments of Kobert were repeated with the true article, Solanum insidiosum, the results would be more favorable.—Pharm. Rundschau, July 1889, 168.

Atropa Mandragora—Characteristic Specimens.—In 1888 Dr Richardson recorded some recent researches on the *true mandrake*, the root of *Mandragora officinalis* or *Atropa Mandragora* (see Proceedings 1888, 320–321), a plant which is mentioned by several of the classical authors, and enjoyed a high reputation among the ancients as a medicament, partly on account of medicinal efficiency, but largely on account of the resemblance of the root to the human form. William Wynn Westcott now describes some true mandrake roots, and gives illustrations of them, which show the resemblance to the human form very decidedly. The sample described was several years old, quite dry, and came from Damascus. See Pharm. Jour. and Trans., April 5, 1890, 810.

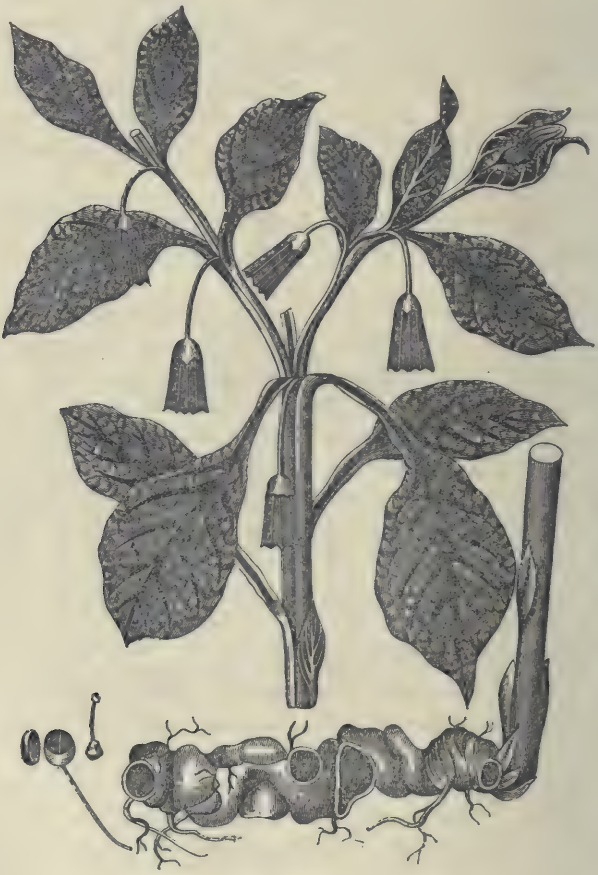
Mandragora autumnalis and M. vernalis—Isolation and Character of an Alkaloidal Constituent, "Mandragorine," which see under "Organic Chemistry."

Scopola carniolica, Jacquin—Characters, Constituents, Pharmacy and Therapeutic Action.—Two species of *Scopola* have within the past few years been made subjects of chemical investigation, viz., *Scopola Japonica* and *Scopolina Hladnikiana* (see Proceedings 1888, 321–322). A series of papers has now been published in "Pharm. Jour. and Trans." (Dec. 14, 1889, 461–472), which introduces a third species—*Scopola carniolica.* In the introductory paper Prof. W. R. Dunstan says that rather more than a year ago his attention had been called to a rhizome which had recently appeared in the drug market, being offered as a substitute for the root of *Atropa Belladonna* under the name of *Belladonna Scopolia.* It was imported from Germany, and was stated to grow wild in the Carpathian Mountains and in other parts of Austro-Hungary. The juice of the plant was supposed to possess mydriatic properties. From further inquiries it appeared that an abundant supply of the plant could be obtained should any demand arise for it. Chemical investigation soon showed that this plant is a new and important source of *hyoscyamine;* but before giving the results of this, it may be well to give the abstract of the papers on the natural history of the plant and of the histological character of the rhizome.

Natural History—After giving a complete history of the synonymy of this plant, commencing with Matthioli, who in 1563 named it *Solanum somniferum alterum*, E. M. Holmes says that the geographical distribution of *Scopola carniolica* appears to be limited to S. W. Germany (Bavaria), Austro-Hungary (Styria, Carinthia, Carniola, Croatia, Banat, Transylvania) and S. W. Russia (Podolia and Volhynia). It grows in damp, stony places, among bushes in beechwoods on calcareous soil, chiefly in hilly or mountainous districts. In appearance it closely resembles belladonna in shape of leaf, shape, color and position of flower, in the branching of the stem, and in the floral leaves being frequently geminate. But it differs in its short stature (about 1 foot high) in the more reticulated, thinner leaves, the capsular, transversely dehiscing fruit, and in the presence of a rhizome.

Two varieties of the plant were described by Koch (Syn. II., p. 585), the common form (Fig. 32) having tubular bell-shaped flowers of a brownish-purple color, and the other, growing at a higher elevation, having an obovate-campanulate corolla of a green color. The latter was described by Koch under the name of *Scopolina Hladnikiana*, suggested to him by Freyer, who also issued the plant as *Scopolina viridiflora* in Rabenhorst's *Flor. Eur. Exsicc.*, No. 2056. A third variety, with yellow conical-campanulate flowers, is mentioned by Decandolle under the varietal name *β-concolor*.

FIG. 32.

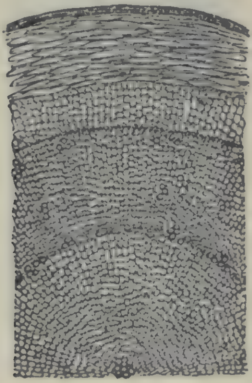


Scopola Carniolica, Jacquin.

The genus forms a link between the genera *Hyoscyamus* and *Atropa*. In the tissue of the rhizome it more nearly approaches the latter genus in having the peculiar sandy raphides present in both root and leaves of belladonna, but not in henbane.

Histological Characters.—Thomas Greenish compares the histological characters of the rhizome of *Scopola carniolica* with those of the *Atropa Belladonna.* Immediately under the epidermis of the *belladonna root,* (Fig. 33) there is a layer of cortical cells forming a dark line. On isolating the individual cells it is found that this cortical layer consists of from six to eight tabular cells deeply colored. Next below on the drawing, but inward in the root, are several layers of thin cells, pressed or stretched in a tangential direction, long and narrow; and further down again several layers of cells not so long and wide; being subjected to less pressure they tend more toward the shape of the cell in its normal condition. These together constitute the bark. Within the bark there is a faint, thin line, the cambium layer, externally surrounding the vascular bundles, which are themselves imbedded in the cellular or fundamental tissue, and in somewhat definite lines. The cells of the bark within that dark line are of a faintly-brown color, and the same remark applies to the cells composing the fundamental tissue, but there is an entire absence of schlerenchymatous cells. All the parenchymatous cells of the bark and from the bark inward are more or less filled with starch grains, but these were removed to make the structure more visible. Most of them *in situ* are compound grains, being composed of two or more adhering together. The typical form is the muller-shaped grain. When the combination is a doublet they adhere by their truncated bases, and when a triplet they are muller-shaped with dihedral bases. A dark spot will be seen here and there in the fundamental tissue. These are cells of raphides cut in a transverse direction. Examining these raphides by a micro-chemical process, the application of acetic acid slowly permeating the tissues under the slide, there was no effervescence, and it was concluded that the raphides are not composed of a carbonate; most

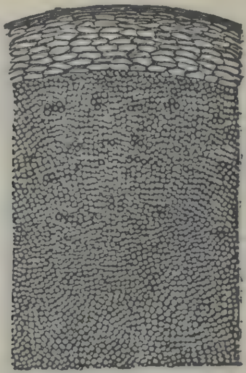
FIG. 33.



Section of Belladonna Root.

probably they are oxalates. Longitudinal sections of each were made, but they exhibited nothing special beyond the cells above referred to, in their length showing a long cell or sac filled with raphides.

FIG. 34.



Section of Scopola Rhizome.

Passing now to a description of the *Scopola carniolica* (Fig. 34), the dark line under the epidermis is narrower and less colored than that of belladonna. The entire bark is not so thick; also, the vascular bundles are neither so large nor so numerous, and the bundles of raphides are less bold than in the belladonna root. In fact, much the same tissues are present, but less pronounced than in belladonna. The starch grains also are smaller, the typical grains being, as in belladonna, muller-shaped, but there is a large number which it is difficult to assign to any well-defined type of starch grains.

Very minute details, when they do not serve to elucidate any point in this investigation, have been avoided. On the whole it will be evident from this histological interpretation that there seems a close alliance in anatomical structure between the rhizome of *Scopola carniolica* and the root of *Atropa Belladonna.*

Chemical Constituents.—Prof. Dunstan and A. E. Chaston give in detail the processes for isolating the various constituents of the rhizome and determining their properties. Of the known mydriatic alkaloids *Scopola carniolica* is shown to contain only one (hyoscyamine) in any appreciable quantity; there may also be present a minute amount of hyoscine, although they were unable to conclusively prove this to be the case. *Scopola carniolica* appears to be distinguished from other plants which yield mydriatic alkaloids in containing hyoscyamine in an almost, if not quite, pure condition. From the fatty and resinous constituents of the rhizome, by treating the acidulated mixture with chloroform, a mass of needle-shaped crystals was obtained, melting at 137.5°, and on combustion yielding results agreeing with the formulas $C_{26}H_{44}O$ or $C_{27}H_{46}O$, each of which has been assigned to cholesterin. The amount was rather more than 0.1 per cent. It appears to most nearly resemble phytosterin (from seeds) and daucosterin (from carrots) and to have been for the first time noticed in the natural order Solanaceæ. The authors obtained it also from the root of *Atropa Belladonna*, and approximately in the same amount as from the scopola rhizome. After recrystallization of the acids, obtained by saponifying the fat, they appear to consist mainly of arachic acid, $C_{20}H_{40}O_2$.

A crystalline sugar has also been obtained which reduces Fehling's solution and yields an osazone apparently identical with that obtained from dextrose. A crystalline substance which is highly fluorescent, especially in alkaline solutions, appears to be identical with Eykman's scopoletin, and with the chrysatropic acid of Kunz; there are grounds for believing it to be methyl-æsculetin.

Pharmacy.—F. Ransom has experimented with a view to making various pharmaceutical preparations from the scopola rhizome, and gives formulas for *Extractum Scopolæ alcoholicum*, *Extr. Scopolæ liquidum*, *Emplastrum Scopolæ*, *Linimentum Scopolæ*, *Tinctura Scopolæ* and *Unguentum, Scopolæ.* The formulas for these will be found under their proper headings under "Pharmacy." Finally, Dr. Sir Dyce Duckworth records the results of his observation respecting the

Therapeutic Action of Scopola carniolica, from which he thinks it justifiable to affirm that in scopola we have a drug which proves itself equally effectual with belladonna.

Scopola—Additional Notes.—Prof. J. M. Maisch supplements the above paper by some further historical and pharmacognostical notes, to which, as well as the above, reference may be had in Amer. Jour. Pharm., Feb. 1890, 99–109; from Pharm. Jour. and Trans., Dec. 14, 1889, 461–472.

Scopola carniolica—Percentage of Hyoscyamine in the Rhizome.—J. B. Nagelvoort has examined a quantity of scopola rhizome, derived from Germany through the common channels of commerce, and obtained from it 0.5 per cent. hyoscyamine. He expresses the opinion that if it be found that this rhizome contains the hyoscyamine in not very variable quantities, it will be used in chemical factories, if not in medicine.—Amer. Jour. Pharm., June 1890, 284.

Scopola japonica—Microscopic Distinction of the Rhizome from that of S. carniolica.—E. Collin has made an extended microscopical examination of the rhizome of *Scopola japonica*, and finds that it differs from *S. carniolica* only in the greater size of the fibro-vascular bundles, these being rather less developed in the case of *S. carniolica*. In the radical arrangement of the vascular bundles, in the presence of starch, in the pulverulent form of the raphides of oxalate of calcium and in the absence of lignified fibres from the pericycle, these rhizomes are analogous to belladonna.—

Pharm. Jour. and Trans., March 29, 1890, 792; from Jour. de Pharm. et de Chim., March 1, 1890, 240.

Scopolia atropoides—Alkaloidal Constituents.—C. Siebert has found the leaves and root of *Scopolia atropoides* to contain *hyoscyamine*, together with a little *atropine*, though it is possible that the latter is a product of decomposition. Owing to insufficient material, *hyoscine* could not be obtained in a state of purity, though the auro-chloride obtained corresponded in its external character with auro-chloride of hyoscine. The other constituents observed were *scopoletin*, *betaine*, *choline*.—Arch. d. Pharm., No. 3, 139–145.

Scopolia atropoides—Presence of a New Alkaloid Resembling Hyoscine.—Dr. E. Schmidt having obtained some hyoscine, hydrobromate and alkaloid, prepared by C. J. Bender from *Scopolia atropoides*, upon closer examination found the free base to differ from the hyoscine of Ladenburg. It was in transparent crystals, the size of peas, melted at 59° C., was slightly soluble in water, and freely soluble in alcohol, ether, chloroform and dilute acids. Analytical results appeared to correspond best with the formula $C_{17}H_{21}NO_4$, that attributed to hyoscine, being $C_{17}H_{23}NO_3$. The crystalline hydrobromide also presented characters different from those attributed to hyoscine hydrobromide by Ladenburg, and appeared, in fact, to be a salt of the new base. The gold salt was very characteristic, forming shining needles, 2 centimetres long, moderately broad, presenting at the margins a peculiar comb-like or serrate appearance, and generally showing a distinct striation. The anhydrous crystals were difficultly soluble in water and melted at 214°. The occurrence of this base has since been found to be not limited to the root of *Scopolia atropoides*, since it has been isolated in small quantities also from *Atropa Belladonna*, *Duboisia myoporoides* and *Datura Stramonium*. Dr. Schmidt thinks that its presence in *Atropa Belladonna* probably explains Ladenburg's discovery of oxytropine among the products of the action of baryta water upon belladonnine.—Pharm. Jour. and Trans., May 3, 1890, 890; from Apoth. Zeit., April 12, 1890, 186.

Anisodus luridus—Constituents.—Dr. Carl Siebert has subjected some specimens of *Anisodus luridus*, a native of the Himalayas, grown in the Marburg Botanical Garden, to examination. He found the flowering plant to contain *hyoscyamine*, but no atropine, whilst the partly wilted plant, that had gone to seed, contained no hyoscyamine, but instead a very small quantity of *atropine*. Hyoscine was not obtained, possibly because the quantity of material was insufficient. The results point out the important fact that the alkaloidal constituents of the plant are materially influenced by the degree of its development.—Arch. d. Pharm., 1890, No. 3, 145–146.

Duboisia myoporoides.—The alkaloidal constituent is apparently not *du-*

boisine, but *hyoscyamine* and *hyoscine*. See *duboisine*, under "Organic Bases."

Fabiana imbricata—Proximate Examination.—Referring to the description and chemical examination of this drug, commonly called "Pichi," by Dr. A. B. Lyons (see Proceedings, 1886, 393–397), George A. Deitz, Jr., communicates the results of his recent examination of the woody branches of *Fabiana imbricata*. These results differ in some respects from those obtained by Dr. Lyons, the difference being possibly due in some degree to the fact that in the experiments of the latter the woody portion was rejected, the bark probably being more active, and yielding more extract. In Mr. Deitz's experiments the woody portion and bark were ground together. *Petroleum ether* dissolved 1.15 per cent. of the drug, which consisted of a trace of volatile oil, a fat melting at 40°C., a wax melting at 45° C., and a caoutchouc-like body soluble in chloroform, insoluble in the other usual solvents, and melting at 65° C. *Stronger ether* extracted 1.41 per cent. of the drug, and from this ethereal extract a *fluorescent crystalline glucoside* was extracted by warm water, while the undissolved portion yielded to absolute alcohol a neutral *crystalline compound*. The

Fluorescent Glucoside was obtained from its ethereal solution in the form of stellate groups of crystals. These crystals were soluble in water, alcohol, chloroform and ether. With concentrated sulphuric acid and potassium bichromate a dark-green color was developed, with nitric or hydrochloric acid a yellow color with some fluorescence, and with potassium or ammonium hydrate a deep yellow with bluish fluorescence. The

Neutral Crystalline Compound, when pure, constituted pure white crystals, which were entirely insoluble in water, but soluble in boiling 95° per cent. alcohol, absolute alcohol, chloroform and ether. They gave a dark-blue color with sulphuric acid and potassium bichromate, but they were insoluble in and unaffected by concentrated solutions of the alkaline hydrates. They did not melt, but became brown from decomposition at 270 C., the highest temperature to which they were subjected.

The other constituents of the drug were resin, mucilage (2.13 per cent.), albumen (2.04 per cent.), and a number of the usual constituents, but only traces of sugar, and no starch or tannin. Neither could a trace of alkaloid be found, although Dr. Lyons thought he detected a small quantity. The amount of moisture in the original drug was 7.75 per cent.; the ash 10 per cent.—Amer. Jour. Pharm., Aug. 1889, 405–407.

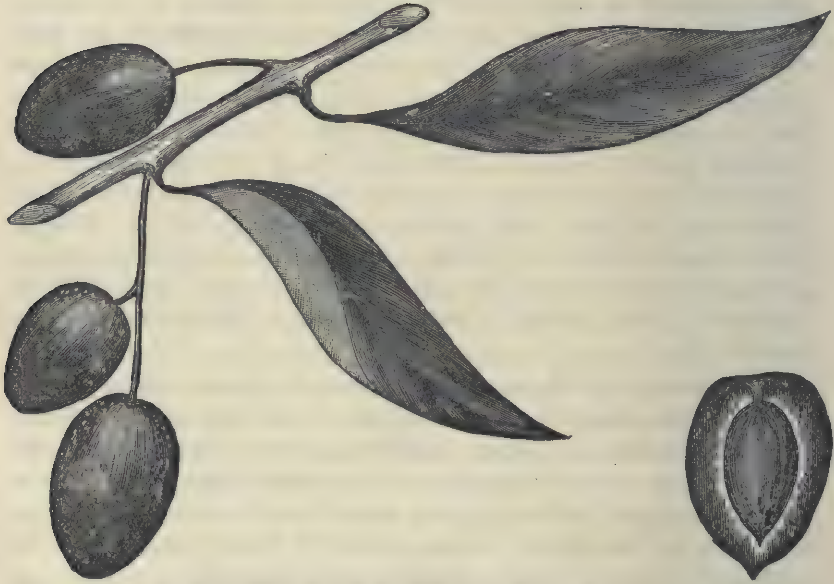
Henry Trimble and Hermann J. Schroeter have prepared the

Neutral Crystalline Compound from Pichi, described in the above paper, from the sediment of a large quantity of fluid extract of pichi. After complete purification, a number of combustions were made, which lead to the formula $(C_{18}H_{30}O_2)_x$. The compound is apparently a resin, and without medicinal value.—Ibid. 407–408.

OLEACEÆ.

Olives—Varieties, etc., Cultivated in California.—Prof. W. M. Searby communicates an interesting account of a visit to a California olive grove, from which the following respecting the varieties of olives cultivated and the preparation and characters of the olive oil produced is abstracted. The fruit of the Mission olive, (Fig. 35), which is the variety from which most of the California olive-oil has been made hitherto, does not mature until December, though some varieties ripen earlier. Before extracting the oil the fruits are dried by spreading out on the ground in a sunny place. Mr. Elwood Cooper, who produces very fine oil on a larger scale at Santa Barbara, uses artificial heat. When nearly, but not quite dried, General Hooper crushes the olives by running them through a mill which reduces the pulp and pit to a pasty mass, which is then transferred to a wine-press, lined with a rather coarse cloth. A slight pressure suffices to squeeze out the first oil, which is kept apart and sold as the "first pressing." More pressure is then used, yielding more oil, the "second pressing," and so on to the fourth pressing, which is the poorest, and is mixed with the oil obtained by washing the marc, &c., and is sold for common uses.

FIG. 35.



Mission Olive, also Fruit Showing Size of Pit and Flesh.

After the oil has been pressed out it is strained and allowed to stand until the sediment has been deposited, then filtered and bottled. No refining is found necessary, and no treatment of any kind is resorted to besides that already mentioned. Seventy pounds of undried olives yield 1 gallon of best oil. Probably some persons would get more than this.

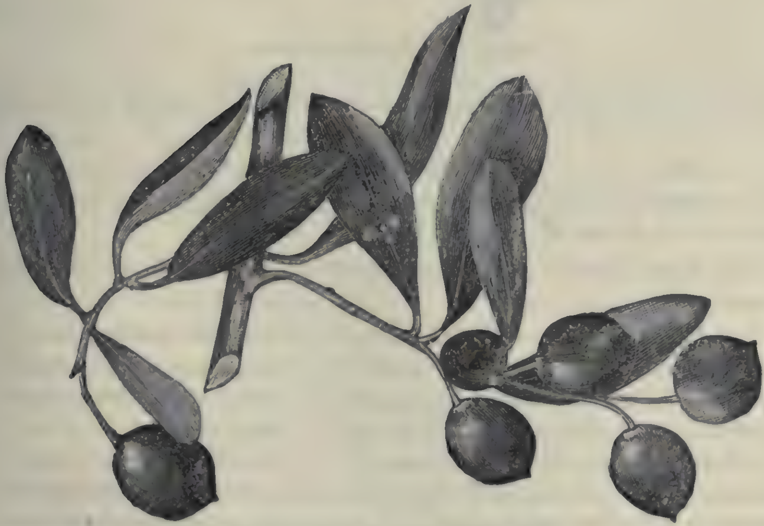
The oil is of a straw color (not green, like the Lucca oil) of a sweet, bland taste. It is very agreeable, though not as pronounced as the ordinary oil; entirely free from acridity, even when eaten by the spoonful. It keeps well, some that had been made two or three years appearing to be still quite sweet.

From information by Mr. B. H. Lelong, Secretary of the State Board of Horticulture, who also furnished the accompanying cuts, Professor Searby gives the following short descriptions of a few of the varieties cultivated in California:

The Mission Olive.—This tree is of good production and of very large dimensions; fruit varies in form; several types have been observed on some trees; this is somewhat peculiar, as among other varieties this does not occur. The fruit hangs on the branches singly, in twos, threes, and also in clusters; color deep purple, changing to jet-black. It carries on its surface numerous white specks, but gradually they nearly disappear upon ripening; a free stone; ripens late. The Mission is a tree of great longevity. Those trees, now growing at the various (Roman Catholic) missions throughout the State, in the prime of health, over a hundred years old, substantiate this statement.

The Redding Picholine (Cal.) Olive.—This little olive was introduced into this State several years ago; it is a tree of small dimensions; fruit small, of a deep blue-black color; (Fig. 36.) the fruit is gathered on cloths, being stripped from the limb with a hand wooden comb. The fruit makes good oil and a sweet pickle, but is best suited as a stock. The true name of this olive is unknown. It does not belong to the Picholine type.

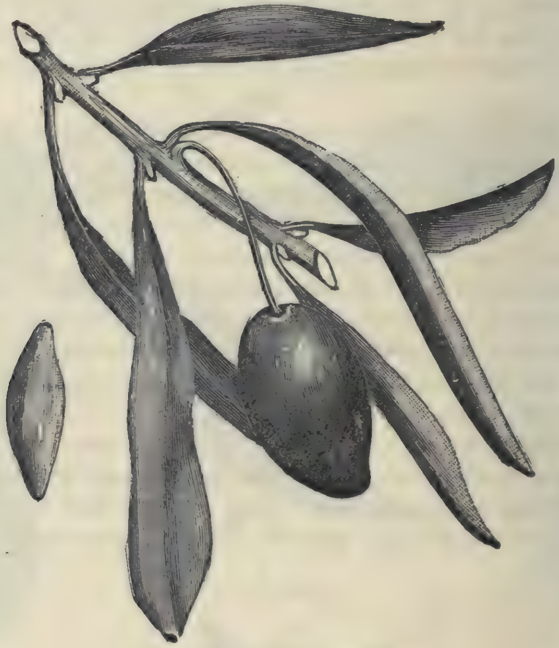
FIG. 36.



The California Redding Picholine.

The True Picholine Olive.—The true picholine is known in Europe by many names (*Olea Europœa oblonga*, *Olea ovalis*, *Olea Europœa saurina*, etc.), has a fruit a trifle below the average size, of elongated form, with a small elongated pit, pointed at both ends. (Fig. 37.) It is cultivated sometimes for its oil, but much more for the purpose of having its fruit picked green and pickled.

FIG. 37.



The True Picholine Olive.

The Rubra Olive.—This is a variety not much known, but recommended on account of its fruiting when quite young and being a heavy bearer. It is cultivated for the oil.

The Pendolier Olive.—This is a large tree, producing a large fruit, and bears heavily.

The Columilla Olive.—The columilla is esteemed as a pickling olive, the color of the fruit remaining yellow until December, when it finally changes to wine-red, and when mature to blue-black. When pickled they are of a beautiful lemon color.—Pharm. Rec., Sept. 2, 1889, 264–266.

Manna—Variety of Plants Producing it.—John R. Jackson communicates a highly interesting review of the plants that are known to yield manna or substances analogous to it. Respecting the manna of commerce, he states that this is almost exclusively obtained from Sicily, the plant yielding it being

Fraxinus Ornus, L., which is there regularly cultivated for this purpose. A description of the mode of cultivation and collection is given. Other plants that yield manna or manna-like exudations are given in the order of the natural affinities of the plants, and not in that of their supposed importance. The following briefly enumerates them :

Tamarix gallica, L., var. *mannifera*, a small tree or bush widely distributed in Europe, Africa and Asia, produces in Persia and Arabia a kind of manna known by the Arabic and Persian names of "Gazangabin" and "Gazanjabin"—names which imply Tamarisk honey.

Astragalus.—From one or more species—*A. florulentus*, Boissier et Haussk., and *A. adscendens*, Boiss., are mentioned—manna is said to be obtained in Persia under the common name of "Gazangabin."

Alhagi Maurorum, Desv.—This is a widely-spread native of the plains of the North-west Provinces of India, Upper Ganges, and Coucan. There appears to exist some confusion between this plant and an allied species *Alhagi camelorum*, Fisch., a spiny shrub of Persia, Afghanistan and Beluchistan, where it is collected from the flowering plants and is imported into India from Cabul and Kandahar. The manna is known in Arabic as "Taranjabin." It is not known to be collected in India.

Crotoneaster nummularia, Fisch. et Mey., and

Atraphaxis spinosa, L., according to Haussknecht, yield the "Oriental Manna," known as "Shir-Khoit," which is found in the bazaars of north-western India, being imported in small quantities from Afghanistan and Turkestan. By Dr. Aitchison it is referred exclusively to *Crotoneaster nummularia.*

Myoporum platycarpum, R. Br., the sandalwood or dogwood tree of Australia, exudes an exceedingly sweet and pleasant manna, which is much sought after by the natives as an article of food, and also highly appreciated by the colonists.

Laryx Europœa yields the so-called "Briancon Manna," which is found on the leaves of the tarch growing on the mountains about Briancon in Dauphiny.

Manna-like substances are also produced from certain plants by the agency, more or less, of insects. Thus the "Eucalyptus manna," or "lerp," which is produced chiefly on

Eucalyptus dumosa, A. Cunn.—A sweet substance also exudes from *E. Viminalis*, Lab., which is interesting as containing an unfermentable sugar called "Eucalin." *Quercus vallonea*, Kotschy and *Q. persica*, Jaub. et Spach, yield "oak manna," through insect agency, while certain species of *Echinops* (probably *E. persicus*, Fisch.), yield the singular manna-like substance that is known as "Trehala" in Syria, and as "Shukkar Tigal" in India. *Pyrus glabra* yields a manna, which is collected by the people in Luristan ; *Salix fragilis* and *Scrophularia frigida* yield saccharine exudations in Persia, and *Cistus ladaniferus* in Spain.

Another singular product, which is a manna only in name, is that furnished by two species of *Lecanora*, namely *L. esculenta* and *L. affinis*, lichens which are said to have appeared suddenly, or even to have fallen in the form of rain, at various times, covering vast tracts of country in Persia, Tartary, the Caucasus, the Crimea, on Mount Ararat, near Damascus, in Algeria, and in the African Sahara. The sudden appearance of these plants has been the cause of their being designated manna, as the people have believed that they have been miraculously sent in times of scarcity, and the lichens have been eaten by both men and cattle. It is thus described by Lauder Lindsay: "The manna is usually found in the form of small lumps, from the size of a pin's head to that of a pea or small nut, which are greyish or whitish, hard, irregular in form, inodorous and insipid. Individual plants weigh from a few grains to about a couple of scruples when dry; the thallus bears no evidence of having, at any period of its growth, been attached to any base of support, and, singularly enough, analysis has failed to discover in it starch, though it has detected no less than 66 per cent. of oxalate of lime in some specimens; hence it has proved deleterious to sheep feeding on it in Algeria, and has only been used by man in extreme need."—Chem. and Drugg., June 28, 1890, 863–865.

VERBENACEÆ.

Clerodendron infortunatum and C. inerme—Constituents, Medicinal Uses, &c.—In the leaves of these plants Mr. D. Hooper has detected a bitter principle and an acid, which he identifies with chiratin and ophelic acid. This discovery is the more remarkable, since chirata belongs to the Gentianaceæ, and clerodendron to the Verbenaceæ, these natural orders being very distinct. The leaves of the *Clerodendron infortunatum* are mentioned in the Pharmacopœia of India as an efficient tonic and antiperiodic, and are said to be used as a vermifuge. The leaves are cordate-ovate, 8 to 10 inches long and 7 to 8 inches broad at the base, hairy and dentate at the margin.

Those of *C. inerme* are much smaller, being only 1 to 2 inches long, oval, smooth, and dotted on both sides with dark green dots. The leaves of this species are used as a febrifuge in intermittent fevers.—Pharm. Jour. and Trans., Feb. 15, 1890, 660.

MYOPORINEÆ.

Myoporum platycarpum—Characters of the Resin.—I. H. Maiden describes the resin which exudes from an Australian plant, *Myoporum platycarpum*—and which is remarkable in that it constitutes *a natural sealing wax.* A sample examined by the author occurs in small rounded lumps usually weathered on the outside, and having a pleasant empyreumatic odor; these are of a dark reddish-brown color, fly with the slightest touch of the pestle, and are easily powdered. The resin has a bright fracture, which appears almost black, but shows reddish-brown at the edges. It softens even with the warmth of the hand, and if kept in a bottle, the heat of an average summer day is sufficient to fuse pieces presenting fresh fractures. It presents some external resemblance to guaiacum resin (especially when that substance comes to market in small lumps), but it is not so green in color as the latter. It has no taste. Cold water has no effect on it, but if the water be heated the resin melts and floats, forming a liquid much resembling tar, but of a purplish-brown color. The water remains clear, colorless and almost odorless.

An examination proved the absence of gum and of tannic acid, its components being summarized in the following:

α-Resin soluble in light petroleum	46.8
β- " " alcohol	28.1
Saline matters	1.7
Accidental impurity	23.4
	100

—Amer. Jour. Pharm., Dec. 1889, 624–625; from Jour. Chem. Soc., 1889, 665.

LABIATÆ.

Lavender—Cultivation in Sussex (England) and Distillation of Oil.—The curator of the Museum of the Pharmaceutical Society of Great Britain communicates some interesting information respecting the cultivation of lavender in Sussex (England) and the distillation of the oil by J. C. Sawer, from which the following may find place here:

"A mild damp winter like the present one does more harm to lavender plants than a hard seasonable frost, as the plants are apt to make green shoots prematurely, and late frosts nip off these tender portions, each of which would otherwise have produced a flower spike. It is necessary to grow the lavender sufficiently far apart to allow of ready passage between the rows, as the plants soon spread their branches, and it is otherwise very difficult, without injuring the plants, to carry the crop of flowers, if required for distillation. The collection has frequently to be done rapidly when the flower is arrived at a certain stage of maturity, and dry weather must be selected for the work. When the plant once begins to flower the blossoms are shed rapidly, and in damp weather the spikes carry much water and lose fragrance."

"The flowers deprived of as much stalk as possible should be distilled, *without previous maceration*, the same day as cut, and not left in heaps, as the flowers rapidly ferment and the character of the oil is quite changed. The still and copper basket employed for rosemary can be used, but of course the condenser and receiver should be different. The receiver should be deep, as the particles of oil passing into it are much smaller than rosemary. If a shallow receiver, they might be carried down into the water pipe. The use of the perforated basket is twofold: 1st. It enables the operator to pull out the charge clean, all at once, without 'drawing' the fire, so that the still is ready for a fresh charge. 2d. It is most important to pervent the flower from scorching by contact with any part of the still. While the basket is being refilled the dirty water is syphoned out and fresh water let in at the same time by a pipe smaller than the syphon, but admitting enough to prevent the copper burning. The complement of water is run through the lid of the basket when that has been replaced. The supply of cold water to the condenser must be plentiful, so as to keep the lower half of it always cold. Nearly all the oil will have passed over in half an hour from the time the mass thoroughly commenced to boil; the rest is a heavier oil. The water passing over with the oil should not be returned to the still; the very small quantity of oil saved by doing so would not compensate for the herbaceous flavor communicated to the next running."—Pharm. Jour. and Trans., Feb. 15, 1890, 659–660.

Pennyroyal—Danger of its Internal Use.—I. G. Marshall expresses the opinion that the indiscriminate sale of pennyroyal by druggists should be forbidden, and mentions a case in which a dose of 3 drachms of the essence produced abortion and dangerous flooding. The dose above mentioned is, however, much larger than is usually taken as an emmenagogue, and would contain, if made according to the B.P. formula for essentia menthæ piperitæ (1 in 5), thirty-six drops of the essential oil, or according to the common formula (1 in 8) about twenty-two drops, a quantity that in either case would be likely to act as a powerful irritant, as would also be the case if almost any other essential oil were used instead.—Pharm. Jour. and Trans., March 29, 1890, 792.

Lycopus virginicus—Proximate Examinations.—Joseph L. Weil analyzed *Lycopus virginicus*, and found it to contain 0.41 per cent. of a fat melting at 50° C.; 0.68 per cent. of a granular wax melting at 70° C.; a small amount of gallic acid; 0.43 per cent. of a crystallizable resin, soluble in ether, chloroform, benzol, and slightly soluble in 95 per cent. alcohol; a small quantity of tannin; a crystallizable glucoside, and the usual plant constituents. The crystalline glucoside may be obtained by extracting the drug with ether, recovering solvent, and treating residue with water, which removes the glucoside, from which it may be removed by agitation with ether. Alcohol may be used instead of ether to exhaust the drug. The glucoside decomposes so readily that it is difficult to obtain pure, the products of decomposition being an amorphous resin-like body and glucose. The crystalline resin can be obtained in the same extraction with ether. After the removal of the glucoside from the ethereal extract by water, the resinous residue, when dissolved in hot absolute alcohol, will in part deposit as crystals, which soften at 113° C., but refuse to melt at 200° C.—Amer. Jour. Pharm., Feb. 1890, 72.

Scutellaria lateriflora—Proximate Analysis.—Carvosso O. Myers and Henry R. Gillispie have subjected *Scutellaria lateriflora* to proximate analysis, and found, besides traces of volatile oil, mucilage 4.20 per cent., dextrin, 2.90 per cent., glucose 2.42 per cent., ash 14.00 per cent, cellulose and allied bodies 55.28 per cent., a *bitter principle*, which is evidently identical with that described by Cadet de Gassicourt in 1824, though they obtained it in large quantities. It was removed from the drug partly by petroleum ether and ether, but completely by alcohol. On removing the alcohol, dissolving the residue as far as possible in water, agitating the aqueous solution with ether and evaporating this ethereal solution, the bitter principle was obtained in the form of stellate groups of acicular crystals. An aqueous solution of these crystals did not reduce Fehling's solution, but on boiling with a few drops of hydrochloric acid an aromatic odor was developed, and then on neutralizing and testing with the above reagent, evidence of sugar was found, showing the compound to be a glucoside.

The same authors made a proximate analysis of another labiate, namely

Nepeta Cataria.—It was found to contain 0.3 per cent. of volatile oil, small quantities of fixed oil, a crystalline wax, 5.80 per cent. of mucilage, 12.62 per cent. of dextrin and glucose, 1.30 per cent. cane sugar, 35.44 per cent. cellulose, 12.50 per cent. ash, and small quantities of a bitter principle. This last constituent was partly removed from the drug by ether, but alcohol was found to be the best solvent. On removing the alcohol, dissolving in water, agitating the aqueous solution with ether and evaporating the ethereal solution, a semi-crystalline substance was obtained, which possessed a very bitter taste and an acid reaction. This substance did not reduce Fehling's solution either before or after boiling with acid, and gave none of the reactions of the alkaloids.

These two drugs resemble each other in composition, although it is certain the bitter principles are different. One is a glucoside, while the other is probably an organic acid. No distinct evidence of tannin in either plant was obtained.—Amer. Jour. Pharm., Nov. 1889, 555–556.

Scutellaria lanceolaria—Isolation and Characters of Scutellarin, which see under "Organic Chemistry."

CONVOLVULACEÆ.

Jalap—Commercial Quality.—Dr. E. R. Squibb has carefully watched the markets of Hamburg, London and New York since his last paper on the subject of commercial jalap (see Proceedings 1888, 328–329), but has not found a market sample that yielded over 9 per cent. of resin, and only one lot which yielded over 7.5 per cent. A special messenger going from a New York house to Jalapa in Mexico, charged to get all he could that was produced in the old way in the old location at any price, secured less than 200 pounds, giving 16.9 per cent. of resin. This gave a rich powdered jalap, and was evidently the old kind; but in appearance and fracture was much inferior to many samples which, under the same management, yielded only 6.5 to 7.5 per cent. of resin.—Ephemeris, July 1889, 1248.

Jalap—Causes of Inferiority.—Prof. F. A. Flückiger, who refers to the above paper of Dr. Squibb, has also given the subject of the deficiency of resin in jalap tubers considerable study and investigation. He says that twenty years ago jalap tubers yielding 10 per cent. and upward to 17.65 per cent. of resin were of frequent occurrence, whereas since then the yield has been in most cases less than 10 per cent., tubers yielding above that percentage being very rare. He thinks that Dr. Squibb's results—16.9 per cent. of resin from tubers of undoubted source and natural condition—point out the real cause of inferiority, viz., partial extraction of the resin. He says: "It may probably be assumed that the dealer in Mexico has acquired sufficient chemical knowledge to wash the jalap with alcohol. If it were previously charred by suitable drying at a fire, it would not undergo any remarkable change through a short immersion in alcohol; and it may easily be demonstrated that if the root is previously bruised this is never the case.—Amer. Jour. Pharm., March 1890; from Jour. de Pharm. d' Als.-Lorr., through Pharm. Jour. and Trans., Jan. 11, 1890.

Jalap—Yield of Resin.—Bellingrodt has observed no diminution in the yield of jalap resin; he publishes results of assays made in 1851–'54, with an average yield of 11.58 per cent. and the average for the last thirty years he gives as 11.60 per cent. E. Dieterich finds the yield for the last two years to have been 7.1, 7.7, 6.6 and 8.1 per cent. These last figures have reference to officinal resin, and not to total extract soluble in alcohol; in the last lot examined by him the total amount soluble in alcohol was 14 per cent., while the officinal resin was only 8.1 per cent.—Amer. Jour. Pharm., June 1890, 295; from Chem. Ztg. Rpt., 1890, 116.

Jalap—Efficient Method of Assay.—F. B. Raynale states that the following assay method for jalap is simple, short and sufficiently close in results: Five grams of powdered jalap are placed in a Soxhlet extraction apparatus, and exhausted with alcohol (85 c.c., sp. gr. .820) for two hours. Around the top of the percolate is formed a ring of resin, which, however, is easily separated and dissolved upon addition of 15 c.c. distilled water to the contents of the flask, followed by brisk agitation. Evaporate the contents of the flask to 20 grams in a tared evaporating dish; pour the concentrated solution into a tared beaker containing 150 c.c. distilled water, in which has been dissolved .7 gm. of lump alum. Rinse the evaporating dish with 5 c.c. dilute alcohol, and pour the washings into the beaker. Allow the beaker and contents to stand at least twelve hours, then pour the solution on a counterpoised filter paper, returning the filtrate once or twice, until the solution becomes perfectly clear. Wash the filter until the filtrate gives no cloudiness with test solution of barium chloride. The beaker, filter and evaporating dish are carefully dried, when the weight of the resin upon them, multiplied by 20, equals the percentage of resin in the drug. For fluid extracts, 5 c.c. are taken and poured into the alum solution, the remainder of the process being as above. Alum is an excellent precipitant of resin, superior to dilute acid, and in the process herein outlined affords results comparing favorably with those obtained by any other process.—Pharm. Era, Feb. 1890, 23.

Jalap—Pharmaceutical Assay.—August Drescher finds the U. S. P. method for "Resina Jalapæ" unsatisfactory for the assay of jalap, and recommends instead the following: Five grams (No. 50 powder) jalap are mixed with an equal quantity of fine sand; transfer to a filter, add gradually 250 c. c. of boiling water, keeping the filter in a hot water jacket; after draining and drying the filter, remove the dregs therefrom, cut out the residue-ringed zones of the filter, add to the dregs, digest the whole with 150 c.c. hot alcohol, filter, wash filter with a little hot alcohol, evaporate filtrate to small bulk, transfer to small beaker, evaporate to dryness and weigh. The resin is then further tested as usual for its purity. The author, furthermore, finds the requirements of the U. S. P. (12 per cent. of resin), and of the Germ. Pharm. (10 per cent.) too high for the jalap of our commerce. The highest he has found is 8.5 per cent.—Amer. Jour. Pharm., July 1889, 340.

Jalap—Cultivation in India.—From the annual report of the Botanical Gardens at Massooree in British India, it appears that another method of cultivation has been adopted there recently which is expected to yield a large increase in the output. The requirements of the Indian Medical Department for the drug are heavy, and it is useless thinking of offering it for issue until there is a large reserve on hand. The Bengal depots alone say they can absorb 1200 lbs. of the dried tubers annually; and as they lose five-sixths of their weight in the process of drying, this will require six times the above weight for one season's supply, or, in other words, 7200 lbs. of green tubers annually. It is therefore estimated that, in order to keep up a continued supply of the drug after once beginning to issue it, there should be a stock of 21000 lbs. of green tubers. This will allow of a third of the stock for issue, and two-thirds to propagate from for future issues.—Chem. and Drugg., Dec. 14, 1889, 820.

GENTIANACEÆ.

Gentian Root—Legislative Enactment to Prevent its Collection before a Certain Period of Growth.—Large quantities of gentian root are collected in Austria, especially in the mountainous districts of the Tyrol, Salzburg, and Steiermark, for use in medicine and as an ingredient in the manufacture of expensive liqueurs. As the root is collected at the flowering period, before the seeds have ripened, and no regard is had by the collectors to the age of the plant, it is feared that in a few seasons the indiscriminate collection may cause the total extermination of this valuable plant. In order to counteract this, the legislature of Salzburg has passed a law prohibiting the digging of gentian roots of less than two centimetres in diameter at the top of the root, which is about the average size of a plant of three years old. The fine for infringing this law is from 5 to 100 florins. Similar acts were passed a few years ago in other districts of Austria, for the purpose of preserving gentian, valerian, Iceland moss, and other economic plants; and in some provinces the collectors have to take out a license, and are strictly looked after by the police.—Chem. and Drugg., Dec. 7, 1889, 791.

APOCYNACEÆ.

Nux Vomica—Relative Proportions of Strychnine and Brucine in its Preparations.—Prof. Beckurts has experimented to determine the relative proportions of strychnine and brucine in nux vomica preparations. Five different samples of extract of nux vomica were taken, the total alkaloids separated, and the relative proportions of strychnine and brucine present in them determined by taking advantage of the difference in solubility of the acid ferrocyanides. The relative percentage proportions of the two alkaloids in these extracts were as follows:

	I.	II.	III.	IV.	V.
Strychnine	48	53.6	42.7	53.1	45.6
Brucine	52	46.4	57.3	46.6	54.4

It therefore appears that in the total alkaloids from these samples the relation of the strychnine to the brucine varied between 42 : 58 and 54 : 46. Assuming then that these extracts were all standardized to contain 15 per cent. of total alkaloids, the one richest in strychnine would contain 8.1 per cent. of that alkaloid, while the poorest would contain only 6.3 per cent., or a difference of 1.8 per cent. According to Falk the physiological activity of strychnine is 38½ times greater than that of brucine, a difference so great that Professor Beckurts suggests that instead of standardizing upon the total alkaloids, it would be better to take into account the strychnine only, and ignore the brucine.—Pharm. Jour. and Trans., Nov. 2, 1889, 341; from Pharm. Centralh., Oct. 3, 1889, 574.

Nux Vomica—Assay of its Pharmaceutical Preparations.—H. W. Snow has collected such processes for the assay of the pharmaceutical preparations of nux vomica as have come within his notice, and, adding his own experience, suggests the following:

The fluid extract may be assayed (and the tincture similarly by evaporating 25 c.c. to 10 c.c.) by diluting 5 c.c. to 50 c.c. with water, adding water of ammonia, and washing out the alkaloid with three or four successive portions of chloroform. From the mixed chloroform solutions, evaporated, if need be, to a convenient bulk, remove the alkaloid by washing with dilute sulphuric acid in two or three successive portions. From this solution again take up the alkaloid (after rendering alkaline by ammonia) with chloroform, evaporate to dryness, again dissolve in chloroform, and transfer carefully, with washing *and without filtering*, to a weighed beaker, evaporate to dryness at 100° C., and weigh the mixed alkaloids. The second solution in chloroform is made for the purpose of leaving behind the small amount of ammonium sulphate which is almost invariably transferred with the chloroform in drawing it off. Drying must be thorough, as it not infrequently happens that small amounts of chloroform are mechanically retained in the alkaloid and not easily driven off by slight heat.

The solid extract (about 1 gm.) may be dissolved in water with the aid of a little ammonia and warming, diluted to 40 c.c., and treated the same as the fluid. Further details of assay will not here be given, but following this paper is a short bibliography on the assay of the drug and its preparations, as contributed from 1881 to date. A. B. Lyons has given us a record of six assays of fluid extracts, showing a range of 0.60 per cent. to 1.6 per cent., with an average of 1.05 per cent. of total alkaloids; and the committee on adulteration of the New York State Pharm. Asso. gave assays of six samples showing unusual uniformity in strength, varying from 1.8 per cent. to 1.2 per cent., with an average of 1.5 per cent.

The following is a record of eight assays taken from the author's notes: 0.58 per cent., 0.92 per cent., 1.35 per cent., 1.47 per cent., 1.98 per cent., 2 per cent., 2.04 per cent., 2.54 per cent.—average 1.61 per cent. W. Simonson has given us the results of assays of thirty-four powdered extracts, showing as low as 2.24 per cent., and as high as 18.9 per cent., with an average of 12.8 per cent., though the general average, excluding the unusual extremes, would show a somewhat higher percentage. A limited number of assays, made by the writer, of powdered extracts of the drug, give a slightly higher average than this, and show the powdered extract to be not greatly inferior to the pilular extract, which has been shown to average about 15 per cent. of alkaloid.

The author also reviews the various methods that have been proposed for the separation and identification of strychnine and brucine, but is evidently not prepared to recommend a method that shall be generally adapted to pharmaceutical preparations of nux vomica.—Amer. Drugg., Nov. 1889, 202–203; from Proc. Mich. Pharm. Assoc., 1889.

Nux Vomica—Rate of Extraction by the Officinal Menstruum.—W. Simonson communicates the results of a series of experiments made to determine the rate of extraction of nux vomica by the officinal menstruum (alcohol, 80 per cent.), and the relation of alkaloid to extractive in the successive fractions of percolate. These results are given in several tables, and are summed up by the author as follows: That the relation of alkaloids to extractive is not constant in exhausting nux vomica, and that, up to a reasonable limit, the total extract increases in strength slightly as the percolation proceeds.

The relation of the alkaloids to each other is the same in the drug in all fractions of the percolate and in the unexhausted marc.

That the oil is removed most readily by first fraction of percolate.

That the value of a well-prepared extract is 16.5 per cent. or more of total alkaloids.

Upon a basis of 2 per cent. dry extract, the tincture should contain not less than 0.320 per cent. alkaloids, a better average being near 0.335 per cent.—Amer. Drugg., July 1889, 128; from Proc. Ohio Pharm. Assoc., 1889.

Curare—Physiological Action.—Dr. Tillie proves by a series of experiments that curare possesses in large doses a tetanizing action, which is quickly manifested if its alkaloidal constituent, curarine, be injected directly into the aorta or applied directly to the spinal cord. Owing, however, to the effect of curarine on the circulation, the part of the dose which does reach the cord is generally either insufficient to produce tetanus, or it reaches it too late to overcome the weakness produced by the want of oxygenated blood. As neither strychnine nor brucine have been detected in curare, Dr. Tillie attributes both the paralyzing and tetanizing action of the drug to curarine. That the tetanizing action of curare is due to the species of strychnos employed in its preparation, and not to picrotoxin or other principles derived from the various plants sometimes used with species of strychnos in the manufacture of curare, is proved by the fact that a genuine specimen of the bark of *Strychnos toxifera*, supplied from the Museum of the Pharmaceutical Society, Bloomsbury Square, gave the same symptoms. The bark, the crude alkaloid and the arrow poison have all been proved by Dr. Tillie to produce paralysis by a peripheral and tetanus by a central action. The suggestions by Gubler and Bartholow that methylstrychnine is formed in the process of preparing curare, is not considered probable, since no such body has been detected; its chemical characters are not those of curarine, and the latter alkaloid has 85 times the paralyzing activity of methylstrychnine sulphate. It appears, therefore, that when the difficulties besetting the examination of the action of curare on the spinal cord are avoided, curare produces tetanus just like strychnine. The two alkaloids, according to Dr. Tillie, have a converse action, small doses of curare paralyzing the motor nerves and small doses of strychnine producing tetanus, large doses of either alkaloid showing both actions in protected frogs. These results, however, do not seem to preclude the possibility of the occurrence of two alkaloids, the one having a paralyzing and the other a tetanizing action (as in Calabar bean), in the bark of *Strychnos toxifera* and other species used in the preparation of curare. The chemistry of curarine and the changes that may take place in the natural alkaloid by heat or other agents have yet to be investigated, and this can only be done when a good supply of the bark of a given species has been obtained.—Pharm. Jour. and Trans., May 3, 1890, 893; from Jour. Anat. and Phys.

Strophanthus—Varieties of Foliage Observed in Plants Produced from

Apparently the Same Seed.—Thomas Christy communicates the results of observations on various parcels of strophanthus seeds received by him since 1878, and of plants grown from some of them. So far as could be gathered, his opinion coincides with that already expressed by Professor Fraser, that seeds received under the name "kombé," although differing in some minor respects from "hispidus" seeds, are like them referable to *Strophanthus hispidus.* The seeds of "*Strophanthus glabrus* of Gaboon" were stated to yield a "crystallizable alkaloid," but if this be correct it will be apparent from Professor Fraser's results that they differ in this respect from the seeds of *S. hispidus.* Another variety of seeds was referred to under the name *Strophanthus minor* (B), "very small in size, blunt at one end and having a spike at the other," thought to be suggestive of the appellation "turtle strophanthus," which appears to have contained little active principle. The author calls attention to the difference in the foliage of plants raised from the seeds received as *Strophanthus* "*Kombé*," such appearing to be the seeds of a single variety.—Yearbook of Phar., 1889, 446–449.

Strophanthus hispidus—Chemistry.—Dr. Thomas R. Frazer communicates a very elaborate paper upon the chemistry of *Strophanthus hispidus*, in which he gives in detail the results obtained by treatment of the seeds with petroleum ether, ethylic ether, water and alcohol. The alcoholic extract contains the whole of the active principle.

Strophanthin.—The extract was obtained after the removal of the fat by ether. It amounted to 8.94 per cent. of the original weight of the seeds, and was estimated to consist of 63.367 per cent. of impure strophanthin, 16.275 per cent. of mucilage, and 14.542 per cent. of resin. The extract was the product of three successive percolations, the first with 10 parts of rectified spirit, and the other two with 5 parts each. It was found that the first percolation removed 7.9 per cent. of the 8.94 per cent. of extract obtained, and that it was very much richer in strophanthin than the products of the succeeding percolations, nearly all the active principle being extracted by the ten parts of spirit, and in a more satisfactory state than in the latter portions of the extract. Further experiments showed that most of the coloring matter, resin and mucilage, is derived from the testa, and most of the strophanthin and oil from the cotyledons and embryos. Treatment of the dry extract, as well as of an aqueous solution with reagents, failed to indicate the presence of an alkaloid, but the reduction of Fehling's solution by solutions of the extract in dilute acids gave evidence of a glucoside. This action was satisfactorily connected with a substance that appeared in well-formed crystals during the evaporation of non-acidulated watery solutions of the extract, and which was identified as the active principle strophanthin. In fact it was found that strophanthin is readily decomposed by weak solutions of acids, yielding glucose and a body that has been named "strophanthidin," which crystallizes so readily that it is thought that its production in an extract by treatment with an acid might be taken as an indication of the amount of active principle originally contained therein. Strophanthin is difficult to separate; but it was obtained pure by a somewhat tedious process depending upon the formation of a tannic acid compound and subsequent decomposition by lead oxide, and it yielded upon analysis results corresponding with the formula $C_{16}H_{26}O_{8}$. Strophanthidin, the product of decomposition of the glucoside, is described as having an intensely bitter taste and a neutral reaction, and as being very slightly soluble in water, moderately soluble in cold and freely in warm rectified spirit. It is extremely active as a pharmacological agent, with symptoms closely resembling those of strophanthin. Strophanthin was also found to be present in the comose appendages and the seeds, the pericarp of the follicles, the leaves, branches, stem and root. No alkaloid was detected, but in the lead precipitate from an aqueous solution of the alcoholic extract a compound was found, of strongly acid reaction and freely soluble in water, to which the name of "kombic acid" has been given.—Yearbook of Pharm., 1889, 449–470.

Strophanthus glaber—Characters of Active Principle.—In a former communication (see Proceedings 1889, 447) Arnaud describes two crystallized substances, *ouabain*, $C_{30}H_{46}O_{12}$, obtained from the wood of *Acon-kathera Ouabaio*, and *strophanthin*, $C_{31}H_{48}O_{12}$, from the seeds of *Strophanthus Kombé*. He has since examined the crystallized substance contained in the seeds of *Strophanthus glaber* of Gaboon, which furnish the arrow-poison of the Pahonin tribe. This principle appears to be identical with ouabain, which exhibits toxic effects almost identical with strophanthin. Hardy and Galois have also described a crystallized substance from *Strophanthus glaber*, but imperfectly for want of material. These substances are glucosides, and low temperatures must be adhered to in the extraction in order to avoid decomposition. The crystals of the glucoside from the seeds of Strophanthus glaber (which gave the remarkably high yield of 4.7 per cent.) are transparent, very slender, and of rectangular form; by slow crystallization they are thicker and become opaque. The melting point is about 185° C., but a pasty condition obscures the exact point of fusion. The crystals dissolve in 150 parts of water at 8° C. The aqueous solution exhibits left-handed polarization, and a solution containing 6.5 per cent. at 50° C. gave the coefficient $a_d = -33.8$. Under the influence of dilute acids and heat the substance splits up into a reducing sugar and a peculiar insoluble resin. The crystals of ouabain have the formula $C_{30}H_{46}O_{12},7H_2O$, of which only 6 molecules of H_2O are given off at 100° C.—Amer. Jour. Pharm., Sept., 1889, 469; from J. Soc. Chem. Ind.

Kraussia coriacea—Reputed Poisonous Properties of the Berries.—The curator of the Museum of the Pharmaceutical Society of Great Britain calls attention to a donation of some berries of *Kraussia coriacea*, which have been reputed in Natal to possess poisonous properties. Examined by

Prof. T. Cash physiologically, he found that neither the alcoholic nor the aqueous extraction of these berries possesses any activity whatever. It is suggested that the poisonous action attributed to them is probably due to a mistake in the plant, and that the berries producing such action are not those of *Kraussia coriacea*, but of *Acocanthera venenata* or *A. spectabilis*, the coriaceous leaves of which have a close resemblance to those of the *Kraussia* in size, shape and texture, and which plants are moreover known in Natal to possess powerful poisonous properties. The fruits of the *Acocantheras* resemble in size and shape a small plum, and it seems more probable that these should have been eaten than the small, pea-sized fruits of the *Kraussia*.—Pharm. Jour. and Trans., Feb. 15, 1890, 658.

Quebracho Bark—Separation of New Sugar.—C. Tanret has separated from the bark of *Aspidosperma Quebracho* a new sugar which he names *quebrachit.* He mixed the coarsely powdered bark with milk of lime and extracted the same with 50° alcohol. The liquid is evaporated to ½ liter for every kilo of the bark used, neutralized with acetic acid, and treated with basic acetate of lead. The sugar is precipitated from the filtrate with ammoniacal lead acetate, well washed and decomposed with dilute sulphuric acid. This solution is evaporated to a syrupy consistency, dissolved in alcohol of 90 per cent. to saturation, precipitated with ether, and further purified. Quebrachit has the composition $C_7H_{14}O_6$, sp. gr. 1.54 at 0°C., melts at 186°–187° C., boils in vacuo at 210° C., subliming in needles, is lævogyre $a\,[{}^{-}_{D}] = -80^\circ$, does not reduce Fehling's test, reduces ammoniacal silver nitrate on boiling and does not undergo fermentation with yeast. Quebrachit heated with hydriodic acid yields a lævogyre inosit $C_6H_{12}O_6$, an aromatic compound, melting at 238° C., boiling in vacuo at 250°; rotation $a\,[{}^{-}_{D}] = -55^\circ$.—Amer. Jour. Phar., March 1890, 127; from Compt. Rend., 1889, 908.

Mussænda Coffee—Source; Absence of Alkaloid.—Prof. W. R. Dunstan has analyzed a supposed substitute for coffee which has been introduced under the name of "Mussænda coffee," and which on the authority of Lapeyrère is derived from *Mussænda borbonica*, a new species, so named by him, and known on the island of Réunion as "wild orange." Lapeyrère also stated that these seeds contained 0.3—0.5 per cent. caffeine. Professor Dunstan found no alkaloid (doubtful traces of choline excepted); but ascertained the presence of much protein, little sugar, and of a fat resembling that of nux vomica. According to investigations carried on in the Kew Gardens, the seeds which Lapyrère recommended as a substitute for coffee, come from *Gærtnera vaginata*, a loganiaceous shrub.—Pharm. Jour. and Trans., Nov. 16, 1889, 381.

Calotropis gigantea—Medicinal Use of the Flowers and Bark in India.—E. M. Holmes states that the flowers of this asclepiadaceous plant are used in cough, asthma, catarrh and loss of appetite. The bark of the same plant is used as an alterative, and is said to promote the various secretions of the body, and hence to be useful in skin diseases, dropsy, etc.—Pharm. Jour. and Trans., Feb. 15, 1890, 660.

Tanghinia venenifera—Isolation of a Crystalline Principle—Tanghinin, which see under "Organic Chemistry."

Ophioxylon serpentinum—Isolation from the Root of a New Crystalline Principle—Ophioxylin—which see under "Organic Chemistry."

Adenium Bœhmianum—Isolation of a Glucoside from the Poisonous Extract.—See *Echugin*, under "Organic Chemistry."

ERICACEÆ.

Ericaceous Plants—Andromedotoxin in American Species.—Referring to the list of poisonous Ericaceous plants, in which Prof. Plugge had determined the presence of "andromedotoxin" as poisonous constituent (see Proceedings 1889, 449–450), Alfred J. M. Lasché gives the details of comprehensive experiments in the same direction upon certain American ericaceous plants, viz.:

Kalmia angustifolia, L. (the leaves and twigs);
Kalmia latifolia, L. (the berries), and
Monotropa uniflora, L. (the entire herb.) His results show that the poisonous constituent in this plant, as in those examined by Prof. Plugge, is also andromedotoxin, the largest amount being obtained from *Kalmia angustifolia*. The latter also contained over 11 per cent. of a light greenish-grey resin, easily soluble in alcohol and ether, but difficultly soluble in chloroform, and evidently physiologically inert. A dark brown, soft resin, amounting to 4.66 per cent., was obtained from *Monotropa uniflora*. This also gave no indication of specific physiological action. It has solubilities similar to those of the kalmia resin.—Pharm. Rundsch., Sept. 1889, 208–213.

Vaccinium macrocarpon—Presence of Kinic Acid in the Leaves.—In a former paper (see Proceedings 1886, 411) Edo Claassen had promised to examine the calcium precipitate of an organic acid obtained from the leaves of the American cranberry. From this precipitate he has since obtained a calcium salt in beautiful six-sided plates, and this on nearer examination proved to have all the characters of kinate of calcium. It responded in its physical and chemical characters to kinate of lime, which he had prepared for comparison from pure and undoubted kinic acid.—Amer. Jour. Pharm., May 1890, 240–242.

Azalea viscosa—Presence of Crystalline Principle.—Harry C. Haak found a crystalline principle in the petroleum ether extract of *Azalea viscosa*. The residual extract after recovering the petroleum ether was dissolved in absolute alcohol boiling hot, and this solvent deposited crystals on cooling. The crystals were purified by re-solution in absolute alcohol and treatment with animal charcoal.—Amer. Jour. Pharm., March 1890, 121.

Rhododendron ponticum—Method for the Isolation of the Poisonous Constituent of the Leaves, Andromedotoxin, which see under "Organic Chemistry."

COMPOSITÆ.

Eupatorium purpureum—Proximate Constituents.—Professor Henry Trimble, with a view to the nearer examination and identification of "a yellow neutral crystalline principle," supposed to be identical with "quercitrin," discovered by J. U. Lloyd, in the root of *Eupatorium purpureum*, has had several examinations of the rhizome made by students of the Philadelphia College of Pharmacy, among them one by G. Herbert Ray with the following results:

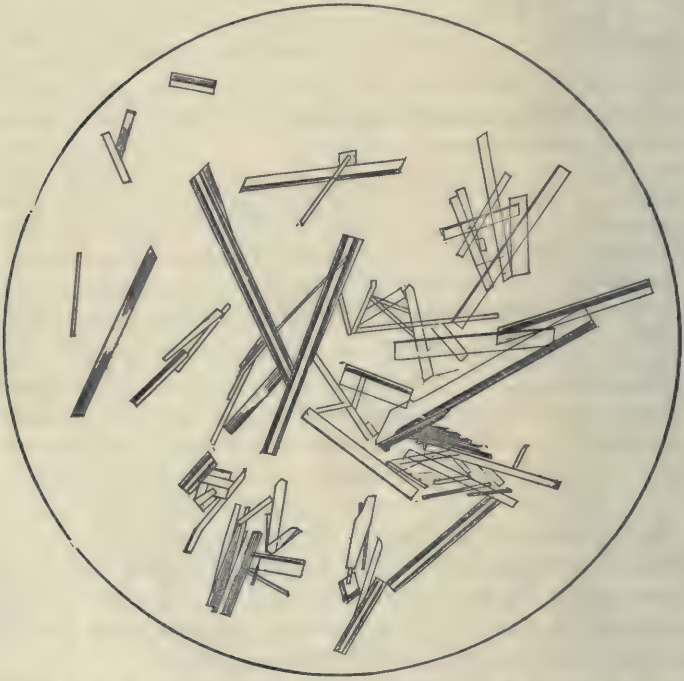
	Per cent.
Volatile oil	0.07
Fat	0.53
Wax	0.29
Yellowish resin dissolved by stronger ether	0.25
Soluble in absolute alcohol	1.10
Mucilage	2.76
Dextrin	2.88
Saccharose	2.04
Glucose	2.29
Albuminoids	1.36
Other organic matter soluble in dilute alkali	2.34
Calcium oxalate	1.82
Incrusting substances	5.15
Cellulose and lignin	54.80
Ash	14.90
Moisture	7.74
	100.32

Mr. Ray concluded by stating that the rhizome is peculiar for the large percentage of cellulose contained in it, and for the small amount of material extracted by the usual solvents, and that the only evidence of a crystalline principle is resin capable of assuming a granular form, but which in no way responds to the tests for quercitrin or quercetin.

Since then Professor Trimble has come into possession of a crystalline substance obtained by E. G. Eberhardt from a sediment in a fluid extract of the above-mentioned drug, and this was found by the latter to be identical with Lloyd's crystalline compound, which, while prepared by a direct process, is stated by Lloyd to be found in the precipitate which occasionally forms in the fluid extract. The further examination and ultimate analysis show the two principles to be not only identical, but also that they constitute a new substance, for which Professor Trimble proposes the name of

Euparin.—It wa sevident from the analyses and reactions that this compound is not quercitrin or quercetin. The only known compound that it resembles is vulpinic acid, but even this is excluded by its composition. In order to determine if the new substance possessed any acid properties, it was treated with a concentrated solution of potassium hydrate, which dissolved it, but allowed it to precipitate on the addition of a small quantity of water. The precipitate was shown to have the same composition as the original material by washing and then submitting it to an ultimate analysis, which gave results very close to those obtained originally, namely, $C_{12}H_{11}O_3$. Euparin crystallizes in the form shown by the accompanying cut (Fig. 38). These crystals, both before and after treatment with animal charcoal, melted at 117.2° C.; at a higher temperature they decomposed and burned without leaving any residue. They were found to be insoluble in water, sparingly soluble in petroleum ether, easily soluble in ether, chloroform, benzol, carbon di-sulphide and boiling alcohol. They dissolved in strong aqueous solutions of potassium or sodium hydrate, but separated unchanged on the addition of a small quantity of water. They were not affected by concentrated hydrochloric acid or nitric acid; conc. sulphuric acid dissolved them with a dark-red color, changing to bluish green.—Amer. Jour. Pharm., Feb. 1890, 73–80.

FIG. 38.



Crystals of Euparin.

Eupatorium aromaticum—Proximate Examination of the Rhizome.—Chas. H. Blouch has ascertained that a drug used to some extent in a proprietary medicine in a Western city, and known under the name of

White Snakeroot, is the rhizome with rootlets of *Eupatorium aromaticum.* On distilling 5½ lbs. of the drug with water, about 25 grains of volatile oil were obtained, having a strong odor and a pungent taste. The drug exhausted by cold water yielded with boiling water a solution which was precipitated with alcohol, and this precipitate behaved like inulin in being colored yellow by solution of iodine, and when boiled with diluted acid in being converted into a sugar reducing Fehling's solution. A tincture was prepared with diluted alcohol, and a fluid extract with a mixture of two parts of alcohol and one part of water; on standing a few days both preparations deposited sediments, which, however, have not been examined. —Amer. Jour. Pharm., March 1890, 124.

Ambrosia artemisiæfolia—Proximate Analysis.—Leslie W. Schwab has examined the leaves and smaller stems, gathered in August, of *Ambrosia artemisiæfolia*, popularly known as Ragweed, Hogweed or Bitterweed. All parts of the plant are bitter, whence its common name, and this bitterness was found to be due to a glucoside, which was partly dissolved from the plant by ether, but more completely by alcohol. On recovering the solvent, dissolving in water and agitating with ether or chloroform, the bitter glucoside was obtained in an amorphous condition. The following is a summary of the constituents found:

	Per cent.
Volatile oil	0.10
Fat melting at 60° C.	1.80
Wax melting at 68° C.	0.08
Resin, Chlorophyll and Glucoside	2.78
Gum and Mucilage	1.61
Dextrin and Glucose	2.89
Saccharose	1.97
Albuminoids	1.87
Pectin	2.42
Incrusting substance	17.78
Lignin and Cellulose	51.19
Ash	9.25
Moisture	6.26
	100.00

—Amer. Jour. Pharm., Feb. 1890, 71–72.

Burdock—Proximate Examination of the Fruit.—Thos. Donaldson found burdock fruit to contain 7.25 per cent. of moisture and to yield 6.66 per cent. of ash. Petroleum benzin extracted 8.6 per cent. of yellow fixed oil, and about 1 per cent. of whitish waxy matter, the latter being insoluble in ether. The alcohol extract amounted to 15.9 per cent., partly soluble in water; the aqueous solution, when concentrated, yielded to chloroform the bitter principle in an amorphous condition. The author's results differ from those obtained by Trimble and Macfarland in 1885 (see Proceedings 1885, 137.)—Amer. Jour. Pharm., 1890, 122–123.

Pyrethrum cinerariæfolium—Cultivation in California.—It is stated that insect flowers *(Pyrethrum cinerariæfolium)* are now being grown on a large scale in California, and that the powdered flowers are sold in that State under the name of buhach. The plant was first introduced into California about twelve years ago by a Mr. Mileo, a native of Dalmatia, who succeeded, after some trouble, in growing the plant on an extensive scale, and in 1880, associating himself with other capitalists, established the Buhach Producing and Manufacturing Company. At the present time the company have about 300 acres of this plant under cultivation at their farm near Atwater, Merced County, California, and own mills for grinding the dried flowers to powder at Stockton, near San Francisco. The cultivation of the *Pyrethrum* requires careful and intelligent supervision, and it cannot be grown successfully without irrigation. It requires three years from the time of sowing to grow plants capable of producing a paying crop of flowers, and then they will bear from four to five years longer. It is at its prime, however, in its fourth or fifth year. The plant grows about thirty inches high, and is set out in rows four feet apart, and from fifteen to twenty-four inches apart in the rows. The flowers are harvested towards the latter part of May. The stalks are cut just above the roots, and the flowers stripped from them by passing the plants through a kind of comb. The detached flowers fall into a box below, and are carried to the drying-ground, where they are spread on sheets and exposed to the rays of the sun during the day, being repeatedly turned over in the meanwhile. They are covered during the night to prevent their absorbing moisture, as the perfect drying of the flowers is most important in order to retain the volatile oil which gives the powder its insecticide properties. It is also very necessary that this operation should be done quickly, and that the flowers during the drying process should be protected from moisture. A slight dew falling upon the flowers at this time will injure their color, and reduce their strength as an insect-destroyer. In this respect the California-grown flowers are said to be better cured, and, consequently, more valuable than those produced in Dalmatia, the particular conditions of soil and climate in California being extremely favorable to the growth and curing of plants rich in the essential oil which renders them so destructive to insect life.—Chem. and Drugg., Aug. 24, 1889. 257.

Insect Powder—Active Constituent.—The value of insect powder is generally supposed to be due to some volatile constituent; it is, therefore, frequently put up in well-closed containers, and considerable stress laid upon its having a decided odor, if effective. E. Hirschsohn, examining a sample of the powder, which for five years had been kept in a paper box, found it to be entirely odorless, but as effective as when purchased. A number of fresh samples of Persian and Dalmatian powders, which were tested and found to be effective, were heated to 120° C. for eight hours, but had not lost their activity, although they were completely deprived of odorous principles. Thinking that the value depended upon the presence of acid resin, and this gradually becoming neutralized by absorption of ammonia from the atmosphere might cause deterioration, experiments were made, in which the powder was mixed with alcoholic ammonia to alkaline reaction and allowed to dry at ordinary temperature; when dried, the powder showed the original activity, neither being increased nor decreased. Of various solvents, water gave an inert extract upon evaporation; 95 per cent. alcohol, 70 per cent. alcohol, chloroform, ether, benzol, carbon disulphide and petroleum-ether, all extracted the active constituent, and the residual powder was inert. With the exception of the carbon disulphide extract, which was neutral, the extracts were acid to litmus paper. If the active extractions be mixed with some inert powder, like powdered chamomile, the product acts like the original powder. Seventy per cent. alcohol will remove from the petroleum-ether extract an oily, resinous mass, which, placed upon the tongue, produces a sensation similar to an extract obtained from the pyrethrum root; these substances must be different, however, as pyrethrum possesses no vermin-destroying properties.—Amer. Jour. Pharm., June 1890, 293–294; from Pharm. Ztschr. f. Russl., 1890, 209.

Helianthus—Characters, etc., of the Fixed Oil of the Fruit.—Charles B. McKeel extracted a quantity of the fixed oil from *sun-flower fruit.* This oil when pure is almost free from odor, and is said to be used for culinary purposes. The oil was found to exist in the fruit to the extent of 27.06 per cent., and was obtained by extraction with petroleum ether. On the large scale a gallon of oil is obtained from a bushel of the seeds. As ordinarily extracted the oil has a light yellow color and a slight nut-like odor and taste. It is soluble in ether and chloroform, but insoluble in alcohol, and is easily saponified, but is non-drying in exposure to air.—Amer. Jour. Pharm., March 1890, 122.

Gnaphalium polycephalum—Extraction of Odorous Principle, etc.—Edward S. Smythe obtained the odorous principle of *Gnaphalium polycephalum* (life everlasting), by distilling the drug with water. This substance of semi-solid consistence was diffused through the aqueous distillate from which it was removed by agitation with ether. It was of a light green color and possessed the peculiar odor of the drug to a considerable degree. The drug was found to contain 7.9 per cent. of moisture and 5.7 per cent. of ash. Extraction with the usual solvents failed to yield any unusual plant constituents.—Amer. Jour. Pharm., March 1890, 122.

Solidago Virgaurea—Use in Cardiac Dropsy.—Dr. Mascarel has used

Solidago Virgaurea very successfully in cases of cardiac dropsy. It has long been used by country practitioners to produce diaphoresis. It grows plentifully in the northern parts of the United States, and resembles the "sweet-scented golden rod," or "blue mountain tea." In administering it for cardiac dropsy, Dr. Mascarel reduces the dried plant—stems, leaves and flowers—to a coarse powder, and gives it in doses of one tablespoonful, beaten with an entire egg (yelk and white). He gives but one dose on the first day; but on each of the following days he adds a tablespoonful until seven or eight doses are being taken during the twenty-four hours. The diuresis is said to continue until œdema permanently disappears.—Amer. Jour. Pharm., Jan. 1890, 19; from La France Médicale, Oct. 8, 1889.

Polymnia Uvedalia—Constituents of the Root.—J. U. Lloyd calls attention to this plant, the root of which has for some time been employed in form of tincture, ointment and resin in eclectic practice, and which seems to have found favor recently also among the practitioners of other schools. The common name of the plant is

Bearsfoot, from a fanciful resemblance of its great leaves to the paws of a bear. The root has somewhat the appearance of yellow dock or overgrown dandelion, but it is longer, and in drying is more disposed to become flattened. It exhales an animal-like, unpleasant odor when freshly broken. The outer, leather-colored surface is usually much wrinkled longitudinally. It is soft, light-colored and of a greenish cast internally. From an analysis made by the author in 1880, he determined the presence of two resinous bodies which are the characteristic constituents. They are both extracted by alcohol from the dried root. When the tincture of polymnia made with officinal alcohol is evaporated to a syrupy consistence and this syrup is poured into water, the mixed resins separate with some associated impurities. Chloroform dissolves both resins, leaving the larger share of the foreign bodies; from this filtered solution the mixed resins may be obtained by evaporation of the chloroform. This compound in gravity is between that of water and chloroform, has the odor of the drug, a brownish-yellow color, and is semi-solid at ordinary temperatures. Benzole separates it into:

(1) The insoluble portion: An acrid, dark brown, brittle resin, soluble in chloroform, ether and alcohol, and insoluble in carbon bisulphide.

(2) The soluble portion: A straw-colored balsam-like resin, somewhat thicker than Canada balsam, soluble in ether, alcohol and benzol, chloroform and carbon bisulphide, possessed of an acrid taste and the odor of the drug.

In addition, the root contains the usual soluble constituents of plants, such as glucose and a tannin or tannates, but the aforenamed resins are the characteristic bodies.—Drugg. Cir., Dec. 1889, 267.

Parthenium Hysterophorus—Proximate Examination.—Harry Vin Arny examined *Parthenium Hysterophorus*, which is found in waste places in the West Indies, Northern Patagonia and Southern United States, especially in Florida and Louisiana. It is characterized by its extreme bitterness, due, as shown by the investigator, to a *glucoside* which was extracted from the drug by alcohol, the alcohol recovered and the residue dissolved in water. This aqueous solution yielded the glucoside to chloroform by agitation with that liquid, from which it separated as a brown amorphous mass. The author concludes that this glucoside is the so-called "parthenine" (see Proceedings 1885, 138, and 1886, 416) which was supposed to be an alkaloid. The drug is much esteemed in the West Indies as a substitute for quinine. —Amer. Jour. Pharm., March 1890, 121.

RUBIACEÆ.

Cinchona—Cultivation in India.—David Hooper communicates a very interesting paper on the cultivation of cinchona in India to the "Pharm. Record" (Oct. 7, 1889, 296–299), from which the following is abstracted: It is now twenty-eight years since the cinchona plant of South America was successfully established in India. The two principal localities devoted to the cultivation of cinchona in India are the Nilgiri plantations in the Madras or Southern Presidency, and the Darjeeling plantations in British Sikkim, a dependency of Bengal. The total number of trees in the first named at the present time is 1,709,656, distributed over an area estimated at 1,779 acres, comprising 981,919 *Officinalis*, 655,856 *Hybrids*, 70,693 *Succirubras*, 273 *Calisayas*, and 915 of other kinds. While in this plantation the *C. officinalis* is in preponderance, in the Darjeeling plantations there is a preponderance of *Succirubras*, the total number of trees being 4,851,500, of which 2,182,000 *Succirubras*, 1,647,400 Calisayas, 1,002,100 Hybrids, and 20,000 of other species, are distributed over 20,000 acres, only part of which, however, are under cultivation. It is interesting to note the reduction in *Succirubras* in this plantation during the past 15 years, from 3,873,285 to the present figure, while the *Calisayas* and *Hybrids* have been trebled: the object being to replace the less desirable alkaloid yielding plants by those affording pure quinine. The output of the Darjeeling plantation is all "natural" bark, and is estimated at 300,000 pounds annually. That of the Nilgiri plantation, which amounts to 100,000 pounds of bark per annum, on the other hand, is obtained by four distinct methods: 1. By taking it in longitudinal strips while the tree is alive, and leaving the bark to renew; 2. By coppicing; 3. By uprooting; and, 4. By scraping and shaving the bark. The first method is most in use, and is peculiar to the Nilgiris, having been discovered by Mr. McIvor (the process as conducted by the coolies employed is shown in an excellent engraving accompanying the original paper). The trees are barked in the rainy season, when the bark lifts or is easily removed from the wood. The coolie inserts a knife in the tree as far up as he can reach, then draws it down, making a vertical incision to the ground; he then makes another incision parallel to the first, and, loosening the bark by gently inserting the knife behind it, the strip or ribbon is taken off. Other strips are taken at intervals around the stem, and the tree is then covered by grass or leaves of *Phormium tenax* and bound on by some fibre. The tree is covered after this operation, in order to foster the growth of the bark (renewed bark) from the cambium and to thicken the untouched layers of "natural" bark, which are now termed "mossed" bark. The substance which was employed in covering the partly decorticated tree—namely, moss—is not now used on account of its scarcity, and grass, leaves, tin and even newspapers have been found to answer the purpose. After about two years the trees are again visited and the "mossed" bark is harvested in strips, leaving the renewed bark to thicken and to allow a further supply of renewed bark to take the place of the mossed. The renewed bark is always of greater value than the mossed, and the mossed than the natural, so long as the trees are under 20 years old, for it has been found that after that time the bark ceases to thicken and the alkaloids remain stationary or even decrease. The bark being collected in the wet weather, artificial heat has to be used in drying. Besides those of the government, there are several private estates in the Nilgiris, the plantations in Wainad alone reporting some 5,000,000 plants, chiefly *C. Ledgeriana*, *C. succirubra* and a *hybrid* between the two, the latter being very valuable and yielding as much as 8 per cent. of sulphate of quinine.

Cinchona—Cultivation in Java.—The following abstract from a report of the secretary of the Soekaboemi (Java) Agricultural Society gives full details of the estimated production of Java cinchona for 1890. It appears that there are now 103 cinchona plantations in Java, of which 78 supplied the information asked for by the secretary. The total area of these plantations is about 160,000 bouws, or 280,458 acres, but part of this lies fallow, and another part is planted with cinchona in addition to other cultures. The total surface under cinchona (private and Government) is estimated at 31,552 acres, containing about 40,000,000 cinchona trees. The actual crop for 1889 was about 15 per cent. in excess of the estimates, but the average quality of the bark was slightly poorer than anticipated. The figures concerning the 1889 crop and the estimated yield for 1890 are as follows:

	Estimate 1889.	Actual yield 1889.	Estimate 1890.
Crop in kilos	2,055,900	2,386,935	2,625,250
Average per cent. sulphate quinine	4.16	4.05	4.07
Total weight quinine, kilos	85,509	96,733	106,899
" " " oz.	3,019,000	3,416,000	3,775,000*

* Or about 60 per cent. of the estimated requirements of the world.

There are five estates in Java which have each more than 1,000,000 trees in the open, and one of these harvests exclusively pharmaceutical barks. The largest estimated yield for 1890 on any single estate is 150,000 kilos of bark, and the highest estimate of the average percentage of quinine in the bark is 6¼ per cent. Among the 78 estates which supplied information there are no less than 27 which have never yet given any harvest, but some of these will yield their first crop this season, and several are very large estates, whose produce, when once they begin to harvest, will tell heavily upon the total exports.—Chem. and Drugg., March 29, 1890, 451.

Cinchona—Assay by the Intervention of Petroleum.—E. Landrin uses kerosene as a solvent for the liberated cinchona alkaloids in a process of assay for Java red bark, as follows: 300 gm. of finely powdered bark are mixed with 75 gm. of lime, suspended in water, and 75 gm. of a solution of soda of 40° B. The use of both alkalies is essential to complete extraction of the alkaloids. Two liters of petroleum are then added and the mixture heated at 100° C. for about twenty minutes, with considerable agitation. The petroleum is decanted off, and the residue treated in a similar manner with a second quantity of 2 liters. The 4 liters of oil are then agitated for ten minutes with 75 c.c. of a 10 per cent. solution of sulphuric acid and 150 c.c. of water, the acid liquor decanted off, and the treatment repeated with the same quantities, and a second time with half the quantities. The first and second acid solutions are heated to boiling and neutralized with ammonia, in order to precipitate the resins, and the third acid liquid, which is used to wash the filter in the first operation, is treated in a similar manner. When the neutralized liquids cool, they deposit, in the form of sulphates, about 90 per cent. of the alkaloids present in the bark. The mother-liquids are precipitated with soda, and the precipitate is treated with just sufficient dilute sulphuric acid to convert it into sulphate. The sulphates are weighed together and the different alkaloids separated in the usual way.

The particular *Cinchona succirubra* examined and reported on by the author contained: Total alkaloids, 7,592 per cent.; crystalline salts, 5,183 per cent.; quinine sulphate, 2,127 per cent.

Water dissolves from the bark the greater part of the acid principles which it contains; alcohol is about equally efficient, but, contrary to the usual statement, it was found that dilute hydrochloric acid dissolves a slightly smaller quantity.—Amer. Drugg., Oct. 1889, 196; from Compt. Rend., 108, 750; through Jour. Chem. Soc.

Quina morada—Proximate Constituents.—P. N. Arata and F. Canzoneri have examined a specimen of bark found in Bolivia and in the north of the Argentine Republic, commonly known as "Cascarilla," or "Quina morada," and credited with many of the therapeutic characteristics of the true cinchona bark. For a variety of reasons the authors consider it to belong to the *Pogonopus febrifugus, Benth. et Hook.* In appearance the bark is irregular on the outside and scaly within; the color varies from yellowish-white to reddish, and is a dirty white on freshly exposed surfaces; it is soft and spongy to the touch, a little lighter than water, has a slightly bitter taste, scarcely any odor, and burns very readily, leaving a white ash. It imparts a bluish fluorescence to water with which it has been boiled, and a yellowish-blue fluorescence to alcohol. Two substances were extracted from this bark, namely, a blue fluorescent substance, moradin, and an alkaloid, moradeine.

Moradin contains no nitrogen, and its formula is either $C_{21}H_{18}O_8$ or $C_{16}H_{14}O_6$. The former agrees better with the composition of the acetyl-derivative triacetylmoradin. Moradin crystallizes in slender, colorless needles, or in large, anhydrous prisms, and melts at 201–202°. It has the characters of an acid, but none of its salts could be isolated. Alkalis increase, and acids (except acetic) diminish the fluorescence of its solutions. Ferric chloride gives a green coloration, and, after a time, a green precipitate; gold chloride gives a blue coloration and green precipitate. It is dissolved by concentrated sulphuric acid, forming a yellow solution, from which it is re-precipitated unchanged on adding water. Although not a glucoside, it reduces Fehling's solution when heated with it; it also reduces silver nitrate and basic lead nitrate. Potassium permanganate in alkaline solution and ferric chloride in alcoholic solution oxidize it to quinone. The action of nitric acid is characteristic; the concentrated acid has no action in the cold, but forms oxalic acid on heating; on boiling with very dilute (4 per cent.) acid, quinhydrone and quinone are successively formed. Its reactions place it in the class of oxyhydroquinones, since it gives as products of decomposition a di- or trihydroxybenzoic acid which colors ferric salts green, a polyvalent phenol, probably hydroxyquinol, and quinone. It is probable that two of the oxygen atoms are contained in the same way as in hydroxycoumarin (umbelliferon).

Triacetylmoradin crystallizes from its alcoholic solution in white, shining prisms which melt at 177° to 178°. It is not fluorescent, and has no acid properties. It is insoluble in alkalis in the cold, and decomposes when warmed with them.

Moradeine crystallizes in opaque, colorless prisms, very soluble in alcohol, ether, chloroform, etc., but only slightly in water. It melts at 199–200°, and exhibits the general reactions of an alkaloid, forming a well-crystallized platinochloride and aurochloride, etc.—Pharm. Jour. and Trans., April 19, 1890, 854–855.

Ipecacuanha.—Standardization of *Fluid Extract* and *Wine*, which see under "Pharmacy."

Coffee—Percentage of Caffeine in Different Sorts.—Julian E. Walter gives the following results of the analyses of several kinds of unroasted coffee:

Java	0.89	per cent.	caffeine.
Liberian Java	1.08	"	"
Salvador	1.01	"	"
Costa Rica	1.24	"	"
Mocha	0.54	"	"
Peaberry or Fenroll	0.77	"	"
Rio	1.12	"	"

The loss of caffeine by roasting he found to be only .04 per cent.—Pharm. Rec., May 5, 1890, 176.

Coffee—Antibacterial Power.—In some experiments upon the dietetic and food value of coffee, Lüderitz has tested its behavior towards pathogenic and nonpathogenic bacteria. He found all the bacteria experimented on to be retarded in their development in nutritive gelatin by relatively small quantities of aqueous infusion of coffee (10 g. coffee to 90 g. water), but the power of resistance manifested by the different species varied. Caffeine seemed to possess some antibacterial power, but it was so slight that its influence in the action of the infusion must be inconsiderable. It is rather to the empyreumatic substances formed in the roasting of the coffee, which have been termed collectively "caffeon," that Lüderitz attributes the essential antibacterial action. In commenting upon this note the editor of the "Pharmaceutische Centralhalle" recalls the fact that fresh raw meat enclosed in the powder of roasted coffee can be dried without the least appearance of putridity.—Pharm. Jour. and Trans., March 1, 1890, 711; from Pharm. Centralh., Feb. 20, 1890, 106.

Cephalanthus occidentalis—Constituents.—Edo Claassen in a former paper (see Proceedings, 1889, 730) described "cephalanthin" as one of the constituents of the leaves of *Cephalanthus occidentalis.* He has now determined that citric acid is also a prominent constituent, and that the leaves contain neither malic nor tartaric acid. To determine the absence of these last-named acids, and particularly of malic acid, he found it necessary to deviate in some respects from the methods usually pursued for determining their presence or absence, the association with appreciable quantities of other organic matter, in the presence of citric acid, modifying the reactions. His modification of the process of determining the identity of the three acids, under the conditions mentioned, is given under *citric acid,* which see under "Organic Chemistry."—Pharm. Rundschau, Jan. 1890, 12–13.

CORNACEÆ.

Alangium Lamarckii—Medicinal Use in India.—The root of this tree is used in leprosy, syphilis, and skin diseases. It possesses emetic, diaphoretic and antipyretic properties, and is, according to Mr. Moodeen Sheriff, a good substitute for ipecacuanha in all diseases except dysentery.—Pharm. Jour. and Trans., Feb. 15, 1890, 660.

UMBELLIFERÆ.

Umbelliferæ—Characters of Oil Vessels in the Pericarp of Ripe Fruits.—A. Meyer gives a careful description of the *vittæ*, or receptacles for volatile oil, which are almost invariably found in the pericarp of ripe fruits of Umbelliferæ, and which give them their peculiar flavor and odor. These vittæ are clothed with a peculiar layer which is itself protected by a special cuticle-like membrane, which completely covers the outer surface of the epithele, the whole forming a sac enclosing the special secretion. In only a few species (*Coriandrum sativum*, *Lagoëcia cuminoides*) is this sac entirely unseptated; in a few others (*Heracleum sphondylium* and *caucasicum*, *Sison Amomum*, *Æthusa Cynapium*) it is imperfectly separated; in the great majority of umbellifers the sac and its investing layer are divided into a number of chambers. The layer itself consists of a peculiar substance, the exact nature of which is not yet determined; but it is neither a carbohydrate, a fatty oil, a resin, nor a caoutchouc-like substance, as is shown by its micro-chemical reactions. In some species, between the thick septa and the parietal layer is a ring of irregular thick-walled vacuoles. In *Conium maculatum*, where the vittæ are only rudimentary in the ripe fruit, the peculiar layer is wanting. In one species only where the vittæ are well-developed, *Johrenia græca*, is the aromatic secretion altogether wanting, and replaced by a solid substance. In *Astrantia major* and *Eryngium maritimum*, where the fruit is but slightly aromatic, the vittæ have no layer, but instead of it a fluid secretion. At a very early period in the formation of the vittæ, even in the flower-bud, substances of two different kinds are exuded from the walls of the epithelial cells into the vitta, viz., a watery fluid, and a volatile oil insoluble in water. The vittæ themselves always result from the enlargement of intercellular spaces, not from the absorption of cell-walls. The object of the layer above described is clearly to retain the secretion in the vitta, and to prevent its flowing into the surrounding tissue. The anise oil contained in the vittæ of *Fœniculum officinale* and *Pimpinella Anisum*, and the carvol in those of *Anethum graveolens* and *Carum Carui*, are highly poisonous to birds.—Pharm. Jour. and Trans., Nov. 23, 1889, 404.

Anise Fruit—Clay as an Adulterant.—William Lawson has recently examined a package of anise fruit, which was found deficient in aroma, and contained a large number of small clay casts which resembled anise fruit sufficiently to escape notice by a merely superficial observer. By treatment with water the clay was separated, and on being dried and weighed was found to amount to 70 per cent. by weight of the sample. One can readily understand, that in the harvesting of such an article as anise fruit a small percentage of clay might be accidentally retained. But from the large percentage above noted, and its appearance, there can be no doubt that it has been deliberately added. He finds that a very fair imitation of the adulterant can be made by pressing moist clay through a sieve made of perforated zinc and afterwards drying and baking it in a hot-air chamber, and it is probably by some such process that the fraud has been accomplished.—Pharm. Jour. and Trans., March 1, 1890, 722.

Apium graveolens—Analysis of the Fruit.—Wm. J. Enders has analyzed the fruit of *Apium graveolens*, and found that petroleum ether extracted 18.67 per cent., of which 16.48 per cent. dissolved in absolute alcohol, 1.72 per cent. remained undissolved, and 0.54 per cent. volatilized at 110° C., and represented the volatile oil. The portion soluble in absolute alcohol was a dark reddish-brown, oily liquid of a penetrating odor and a strong taste, though not resembling the odor or taste of the drug. This, according to some writers, consists largely of oil. Stronger ether extracted from the residual drug 1.73 per cent. of a dark brown resinous substance with a strong aromatic odor. A crystalline glucoside was separated from the remainder of the drug by exhausting with absolute alcohol, recovering the alcohol, dissolving the residue in water, and agitating with chloroform. This substance gave the reactions of a glucoside, and gave off a strong odor when boiled with dilute acid.—Amer. Jour. Pharm., March 1890, 121.

BURSERACEÆ.

Myrrh—Constituents.—Dr. Oscar Köhler communicates the results of a chemical examination of "myrrha electa," represented as coming from Somali. The myrrh is described as being in irregular dark to light brown semi-transparent pieces, of different sizes up to the thickness of a walnut. It had an agreeable balsamic odor, and an aromatic bitter taste, felt greasy, and left upon paper oily spots that disappeared after a time. When burnt it gave off white vapor and left 2.79 per cent. of ash, containing phosphoric acid, chlorine, iron, and especially calcium and magnesium. The powdered myrrh was submitted to steam distillation, the residue, after being freed from water, was extracted with absolute alcohol, and the distillate, the soluble and insoluble portions were separately examined. Dr. Köhler reports that the crude myrrh consisted of gum, resin and essential oil. The portion soluble in water, but insoluble in alcohol, which amounted to from 57 to 59 per cent., was recognized as a gum having the formula of a carbohydrate, $C_6H_{10}O_5$. The portion of the myrrh soluble in alcohol was a mixture of resins, the greater part consisting of an indifferent soft resin (*c*), soluble in alcohol and in ether, represented by the formula $C_{26}H_{34}O_5$, in which three replaceable hydroxyl groups are present. Besides this there were two bibasic acid resins, one (*a*), represented by the formula $C_{13}H_{16}O_8$, and the other (*b*), by $C_{26}H_{32}O_9$. The essential oil obtained amounted to from 7 to 8 per cent., a quantity far in excess of that mentioned by Ruickholt (2.18 per cent.); the principal constituent corresponded to the formula $C_{10}H_{14}O$. The formulæ arrived at for the several constituents of the resin exhibit a certain correspondence, in that if the formula given for the (*a*) acid resin ($C_{13}H_{16}O_8$) be doubled, all three formulæ will contain twenty-six atoms of carbon:—

Indifferent resin (*c*) $=C_{23}H_{31}O_2(OH)_3$.
Resin acid (*b*) $=C_{26}H_{32}O_9$.
Resin acid (*a*) $=C_{26}H_{32}O_{16}$.

The differences between the resins therefore consisted essentially in the different amounts of oxygen they contained, and Dr. Köhler thinks this may find an explanation in different stages of oxidation, which would take place principally in the outer parts of the crude resin.—Pharm. Jour. and Trans., June 28, 1890, 1059; from Arch. d. Phar., 1890, No. 7, 291–313.

Balsamodendron Berryi—Characters of the Gum-Resinous Exudation.—David Hooper, referring to a plant which forms thorny hedges in some parts of India, where it is known by the name of *Mulukilivary*, states that it is the *Balsamodendron Berryi*, and that it yields a gum-resin which is used medicinally by the natives. A sample procured by the author was in pale-yellow, yellowish-brown, or brown translucent fragments, tough, and breaking with a shining conchoidal fracture. The surface had an oily appearance, and when scratched or rubbed with some hard implement showed milk-white markings. Pieces of reddish-brown bark were attached to some fragments, and others were adhering to cloth in which it had been collected. Powder was of a dirty white color, and when rubbed up with water made a thin emulsion. The odor was oily, not fragrant. Colonel Beddome alludes, however, to an aroma given off by the plant. The taste was simply mucilaginous. It dissolves for the most part in water, leaving a few flocks of soft resin and impurities undissolved. A selected sample of the gum-resin gave to water 84 per cent. of gum; it contained 5 per cent. of moisture and 6.6 per cent. of mineral matter. The gum was gelatinized by ferric chloride, and like that from true myrrh, was not precipitated by neutral plumbic acetate. The resin was soft, transparent, tasteless, odorless and neutral in reaction. It was soluble in alcohol, ether, bisulphide of carbon and chloroform. The solution in alcohol was not colored by ferric chloride, and gave a right-handed rotation when examined with polarized light. The resin moistened with alcohol gave no color with concentrated nitric or hydrochloric acid, and no violet liquid was obtained when bromine was added to its solution in carbon bisulphide. The resin separated by alcohol and evaporated was exposed to the heat of a water-bath for a week and remained soft and tenacious; after this it was exposed to the air for about two months, but its consistence was not altered, and when examined under the microscope it was seen to be perfectly amorphous. The myrrh from the *Mulukilivary* is evidently distinct from the true myrrh, Arabian myrrh, and *Bissa Bol.* Its freedom from bitterness and fragrance would render it unfit as a substitute for the genuine drug, and useless as a medicinal agent.—Am. Jour. Pharm., Oct. 1889; from Pharm. Jour. and Trans., Aug. 24, 1889, 143.

UMBELLIFERÆ.

Peucedanum eurycarpum, Coulter and Rose—Proximate Analysis.—Prof. Henry Trimble has analyzed the tubers of this plant, which are used by the Indians as food, and were supplied him, together with a botanical and pharmacognostic description, by Dr. V. Harvard, Surgeon U. S. A., at Fort Abraham Lincoln, Dakota. Although the tubers undoubtedly contain small quantities of other compounds—butyric acid, peucedanin, etc.—the following are the constituents as far as its use as a food is concerned:

Starch	35.06	per cent.
Albuminoids	9.63	"
Glucose	3.66	"
Saccharose	1.80	"
Mucilage	3.61	"
Resin, etc.	2.68	"
Wax	2.45	"
Volatile oil	0.02	"
Ash	5.06	"
Moisture	10.30	"
Cellulose	25.73	"
	100.00	"

Tests were made for tannin, but with negative results. A limited supply of the drug being at the author's disposal, he was unable to do more than apply Heut's method for the preparation of

Peucedanin, a neutral principle discovered by Schlatter in 1833—to about 25 gm. of the original substance. By this means, however, a small quantity of a distinct crystalline substance was obtained, nearly pure, which so far as could be determined, was identical with the above compound.—Amer. Jour. Phar., Nov. 1889, 556–558.

Peucedanum Canbyi, Coulter and Rose—Analysis of the Root.—Prof. Henry Trimble also communicates the results of an examination of the bulbous root of *Peucedanum Canbyi*, C. and R., which is used by the Spokane Indians as food, and known by them as "Chucklusa." The bulb, buried 3 or 4 inches under ground, is globular in shape; the transverse diameter from ¾ to 1½ inches and slightly exceeding the vertical diameter. It is covered with black epidermis, easily rubbed off, and entirely made up of a white farinaceous mass with a granular, homogeneous texture. In taste it is very pleasantly palatable with a slight aromatic flavor. It is eaten either raw or baked, and often pounded into flour from which a nutritious and wholesome bread can be made. The results of an analysis of the "chucklusa," obtained by the author from Dr. V. Harvard, U. S. A., Fort Buford, North Dakota, are as follows:

	Per cent.
Starch	17.02
Albuminoids	3.25
Glucose	1.24

	Per cent.
Saccharose	10.66
Mucilage	15.34
Dextrin	.40
Resin	2.57
Fat and wax	2.12
Ash	4.20
Moisture	7.90
Cellulose and undetermined	35.30
	100.00

Tannin was not found, but a small quantity of chlorophyll appeared to exist in the black epidermis.—Amer. Jour. Pharm., June 1890, 281–282.

ARALIACEÆ.

Ginseng—Notes Respecting Its Uses in China and Japan.—P. L. Simmonds communicates some notes on ginseng, from which the following is abstracted: The trade in this root is of some importance, from the export carried on in the North American species, *Aralia quinquefolia* (Decaisne and Planchon), *Panax quinquefolia*. That of China and Upper India is the produce of another species, *Aralia (Panax) Ginseng*. In China and Japan the roots of ginseng, wild and cultivated, are considered a sort of panacea or specific for all diseases. The Chinese consider the Japanese ginseng inferior to that from Mandchouria and Corea. The last is the best and whitest. Old ginseng is imported from Japan. American comes through Singapore. Resinous ginseng, received from Suchon-fu, in the province of Kiansu, is prescribed in hematesis, epistaxis and dysentery. When ginseng is taken, it is given in decoction of 1 to 12 grams, for five or six days continuously, the patient abstaining from tea for about a month. Crude ginseng is the natural dried root; the clarified is rendered translucent by steaming, skimming and drying the fresh root. The finest is reserved for the Court at Pekin, and considered more valuable than its weight in gold.

In Japan *Panax Ginseng* (called Nindzin) is often cultivated in the environs of Hakodata (Isle of Yeso). That collected at Ningkoola is reserved for the use of the Emperor and his family. In Japanese medicine the roots of *Aralia edulis* or *cordata*, known as Udo, are prescribed in heart disease, uterine affections and for stopping hemorrhages. In China this species is prescribed as a tonic in menstrual, chlorotic and puerperal diseases of women. In Japan there is much fraud carried on in ginseng. It is mixed with the roots of *Platycodon grandiflorum*, *Campanula glauca*, *Adenophora verticillata*, and a species of *Convolvulus* root. Another fraud consists of redrying the roots that have been used and sending them again into commerce. Bastard ginseng is *Panax amerigo*, which is reclarified in Canton for export. The sun-dried root of the *Convolvulus* is used as a cheap substitute for true ginseng, and prescribed in cases of spermatorrhœa, debility and severe dyspepsia.—Amer. Jour. Pharm., June 1890, 282-284.

RANUNCULACEÆ.

Japanese Aconite—Yield of Extract and Alkaloid.—Eugene George Reig prepared from Japanese aconite root a tincture and a fluid extract, following the formulas of the U. S. Pharmacopœia for the corresponding aconite preparations. Both were lighter in color than the officinal ones. On evaporating 10 gm. of each the tincture yielded 200 mgm., and the fluid extract 620 mgm. of extract. The alkaloids were determined by evaporation, taking up with water, removing coloring matter by ether, rendering alkaline by sodium carbonate, and extracting the alkaloids by ether. 50 gm. of the tincture representing 20 gm. of root, yielded 67 mgm. of alkaloids. 50 c.cm. of the fluid extract (=40 gm. of the root) gave 145 mgm. of alkaloids. The Japanese aconite used, therefore contained 0.35 per cent. of alkaloids.—Amer. Jour. Pharm., March, 1890, 123.

Aconite and Belladonna—Experiments on the Relative Value of Chloroform and Alcohol, and Mixtures of the Two, for their Extraction.—R. Wright, with a view to ascertaining whether chloroform presents any advantages over alcohol in the extraction of aconite and belladonna, as suggested in Squire's "Companion," made a series of experiments, using alcohol, chloroform and mixtures of alcohol and chloroform in different proportions, as menstrua. With belladonna the best results were obtained with a mixture of four parts of alcohol and one of chloroform, 20 c.c. of a tincture made by maceration and percolation of 50 grams of the powdered root with sufficient menstruum to produce 100 c.c. containing 40 milligrams of alkaloid, against 30 milligrams contained in the same quantity of a rectified spirit tincture, and 11 milligrams in a chloroform tincture. In the case of aconite the best results were obtained with a mixture of three volumes of alcohol and one of chloroform, 20 c.c. containing 76 milligrams of alkaloid against 66 milligrams in the alcoholic tincture and 34 milligrams in the chloroform tincture.—Yearbook of Pharm., 1889, 508–510.

Hydrastis canadensis—Percentage of Ash and Alumina in the Rhizome.—According to R. Gaze, hydrastis contains aluminium oxide in quantity equal to 0.3 per cent. of the dry drug; the total ash amounts to 4.80 per cent.—Apoth. Ztg., 1890, 9.

Nigella Damascena—Insolation of an alkaloidal fluorescent body—Damascenine—which see under "Organic Chemistry."

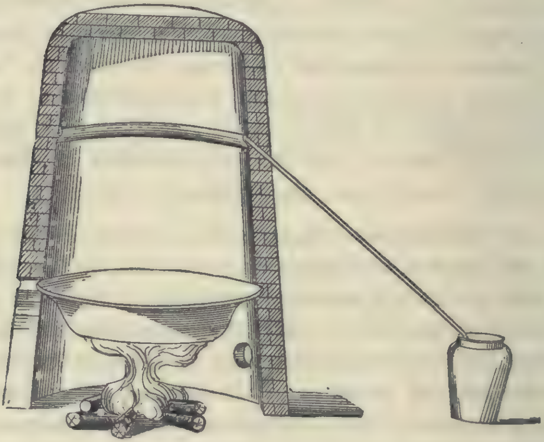
MAGNOLIACEÆ.

Star-Anise—Distillation of Oil in Tonquin.—Dr. R. Blondel has brought to light a number of interesting new facts concerning the cultivation of the star-anise tree in Tonquin. The actual area in which the true star-anise (*Illicium anisatum*) grows is very much smaller than that over which it was generally believed to be distributed. The trees, in fact, grow in one province only, that of Lang-son, outside of which not a tree is found; in

Annam, in the district of Quin-Hon on the coast, grows another species of *illicium*, with smaller fruits, and more arched and smoother capsules, which is regarded as poisonous, and is never gathered for distilling purposes.

Every village possesses its own brick-built ovens (see Fig. 39) in which the distilling process is conducted; some villages have as many as fifty of these ovens, which are large structures of brickwork, from 6 to 7 feet in height, and about 4 feet in diameter at the base. They have a closed and slightly vaulted roof. Part of the brick-work at the base of the back wall is removable, and through it the large copper distilling dish is introduced into the oven. A groove in the brick-work holds the edge of the dish and keeps it in its place. The removable piece is then replaced, thus entirely closing the oven. The seeds are put in a dish with a small quantity of water, and underneath a large wood fire is lighted, which receives air through a small hole at the front part of the brick-work. The essential oil trickles down into a groove about 2 feet below the top, and is conducted through a tin or bamboo tube, whence it passes into the collecting vessel. The distilling dish holds about 8 cwt. of fruit, which yields, on the average, 22 lbs. of essential oil. The vessels containing the oil are brought to the town of Lang-Son, the total quantity sold there being from 600 to 700 hundredweights per annum. At Lang-Son the oil is transferred from the native earthenware pots into tins, which are carried on the backs of natives to Phu-lang-Thuong, on the Song-koi, or Red River, and from there the French steamers take the bulk of the oil to Haï-Phong for shipment, a small quantity also reaching the port by road.—Chem. and Drugg., Jan. 11, 1890, 40.

FIG. 39.



Still for Oil of Star Anise.

True Winter Bark (Drimys Winteri)—Constituents, etc.—P. N. Arata and F. Canzoneri, after an historical summary of the introduction of winter bark into Europe, describe the genuine bark from the Straits of Magellan. This occurs in the form of deeply-furrowed, curled-up fragments with an earthy fracture, exhibiting, when in small pieces, an internal, reddish-brown coloration. When fresh it has a bitter and pungent taste and an agreeable odor, recalling both turpentine and cloves. The sun-dried bark yielded: water (at 110°), 13.713 per cent.; ash, 3.338 per cent.; soluble in ether, 3.841 per cent.; in alcohol, 6.465 per cent.; in water, 13.981 per cent.; ligneous matter, 49.200 per cent. An analysis of the ash is also given. The ethereal solution contains a peculiar essence, fatty compounds, resins, and waxy matter; the alcoholic extract contains reddish uncrystallizable resins. Citric acid was carefully looked for, but not found. The

Volatile Oil was isolated by distilling the bark with water, exhausting the distillate with petroleum, and distilling off the solvent. The crude oil, amounting to 0.6428 per cent. of the weight of the bark employed, is a mixture of several substances.

Winterene, $C_{15}H_{24}$, is the essential oil separated from this by fractional distillation. It passes over between 260° and 255°; specific gravity at 13° = 0.93437. Index of refraction = 1.4931; specific rotatory power at 16° $[x]_j = + 11.2$. It is readily oxidized on exposure to the air, becoming yellow. The formula $C_{25}H_{40}$ was calculated from the ultimate analysis and vapor density, but the authors consider that the ready oxidizability of winterene and its analogy to similar essences points rather to the formula $C_{15}H_{24}$, which would place it in the group of sesquiterpenes, such as cedrene, cubebene, etc., the boiling points of which are between 250° and 268°.—Pharm. Jour. and Trans., June 14, 1890, 1026; from Gazzette, XVIII., 527–529.

BERBERIDACEÆ.

Berberis Aquifolium—Proximate Constituents of the Root.—According to E. Schmidt the root of *Berberis aquifolium* contains berberine, oxyacanthine, berbamine and phytosterin. He found the composition of berbamine and oxyacanthine to be $C_{18}H_{19}NO_3$. The purification of berberine is best accomplished by the following method: A salt of berberine is dissolved in water, acetone and sodium hydrate added, and after the liquid has cooled the crystalline acetone—berberine—is collected and washed. The berberine salts are obtained by boiling the above compound with dilute acids, and the free alkaloid by heating with chloroform and alcohol; these solvents are distilled off, and after cooling the alkaloid is recrystallized from water. The alkaloid obtained differs in some respects from that prepared according to the older method (decomposition of the sulphate with barium hydrate, removing excess of barium with CO_2, evaporating in vacuo and recrystallizing), the latter giving off 6 mol. water at 100° C., the former only 4 mol.; the former further does not absorb CO_2, while the latter does, forming an acid carbonate.—Amer. Jour. Pharm., Jan. 1890, 12; from Pharm. Centralh., 1889.

Berberis Lycium—Identity of the Extract with the Ancient "Lycium."—Sir J. D. Hooker gives an excellent illustration of the *Berberis Lycium* (in "Botanical Magazine" for September, 1889), which flowered in the Kew Arboretum in June and fruited in September. The extract, which is known in India under the name "rusot," and is identical with the lycium described by Dioscorides, is still esteemed in India as an application in ophthalmia, and internally in diarrhœa, dyspepsia and general debility. The history of this ancient drug is given in "Pharmacographia," and specimens of the extracts are to be seen in the Museum of the Society at Bloomsbury Square, and of the dried plant in the Hanbury Herbarium.—Pharm. Jour. and Trans., Sept. 28, 1889, 244.

Podophyllum—Experiments upon the Resinous Components.—Clifford G. Dunn states that the most active constituents of the resin are contained in the first portion of the alcoholic percolate, while the later percolates yield a resin which differs very much from the former in activity.

Podophyllotoxin may be prepared by macerating one ounce of the resin in 4 fluid ounces of chloroform free from alcohol, filtering, and adding the filtrate to 16 parts of benzin. It forms a light yellowish white powder, the chloroformic solution of which should remain clear on the addition of ether, but deposits white flocks when mixed with petroleum spirit.—Amer. Jour. Pharm., March 1890, 124.

Podophyllum Emodi—Examination of the Resin, Podophyllin "Emodi," which see under "Pharmacy."

RUTACEÆ.

Xanthoxylum fraxineum—Isolation of the Crystalline Principle.—Referring to the crystalline principle isolated in 1832 from prickly-ash bark by E. Staples, J. U. Lloyd observes that it is unfortunate that the name "Xanthoxyline" (or Xanthoxylin) has been given to it, since there is conclusive evidence—to his mind—that it in no way represents the medicinal activity of the drug. He had obtained the same principle and described it in 1876, and has since had considerable experience with it. It is easily obtained from the dried bark by simple extraction with any solvent (ether, benzol, etc.) that will also dissolve the fat associated with it; but the best method of extraction in his experience consists in exhausting the bark with alcohol. Distil the alcohol from the percolate, and wash the greasy residue with water. Mix a weak solution of caustic potash with the oily magma, and stir until the oil is saponified. Separate the undissolved material by means of a muslin strainer (mostly xanthoxylin), wash it with water, dissolve it in boiling alcohol, and cool. The crystals of xanthoxylin can be purified by recrystallization from hot alcohol. Chemical investigation may find a home for this principle among well-known classified bodies, thus rendering the name also inappropriate from structural relationships. That xanthoxylum bark contains substances of marked peculiarities and decided characteristics is evident, although these points were, of course, unknown to Mr. Staples. The author considers it probable that the substance deserving the name xanthoxylin will prove to be amorphous: it may not be capable of isolation intact under present imperfect methods of manipulation, and yet that such a body exists those who have cause to work considerable amounts of the drug and are observing have every reason to believe.—Amer. Jour. Pharm., May 1890, 229–230.

Xanthoxylum carolinianum—Distinct Characters of the Crystalline Principle from that of X. fraxineum.—Referring to the above remarks of J. U. Lloyd upon the crystalline principle from *Xanthoxylum fraxineum*, E. G. Eberhardt communicates the results of his experiments made with the crystalline principle obtained by him from the "southern" prickly ash bark, *X. carolinianum*, from which it appears then that the two substances obtained respectively from the northern and southern variety of prickly ash bark are not identical. They are probably allied compounds differing in constitution. By the use of Lloyd's process of preparation the same substance was obtained from *X. carolinianum* as by the process adopted by the author, in which the bark was exhausted with petroleum benzin, the solvent recovered by distillation in vacuum, and the residual oily liquid set aside for the crystals to form. These were finally collected and recrystallized from alcohol until nearly colorless. They melted at 119° C., and a preliminary combustion of .2228 gm. yielded .5511 gm. of CO_2 and .1108 gm. of H_2O; equivalent to 67.46 per cent. of carbon, 5.52 per cent. of hydrogen, and, in the absence of nitrogen, 27.02 per cent. of oxygen. The crystals were now further purified by treatment with animal charcoal and recrystallization from hot alcohol. By this means they were obtained in colorless, silky needles, tasteless, but slightly bitter in alcoholic solution, soluble in alcohol, ether, chloroform, very sparingly in benzin, insoluble in cold, but slightly so in boiling water. On adding a few drops of the alcoholic solution to water, a turbidity was produced which disappeared on heating and reappeared on cooling, the substance separating after some hours in crystalline flocculi.

In a note to his paper, the author adds that experiments made upon an authentic specimen of the bark of *X. fraxineum* confirm the view expressed above that the crystalline principle obtained by him with petroleum ether was identical in its chemical and physical properties with Lloyd's specimen, presented to the Philadelphia College of Pharmacy in 1876. Respecting the

Fixed oil with which this principle is associated, the author says that it appears to be a sulphurated compound. A portion saponified with KOH and subsequently acidified with dilute HCl gave decided evidence of H_2S.

Nitric acid acts energetically upon the oil producing elaidin. The aqueous and acid filtrate from this gives a precipitate with barium chloride insoluble in nitric or hydrochloric acids.—Ibid., 231–236.

Xanthoxylum senegalense, D. C. (*Fagara zanthoxyloides*, Lamarck)—*Proximate Examination of the Root Bark.*—P. Giacosa and M. Soave have found in the root bark of *Xanthoxylum senegalense*, D. C., three alkaloids, one of which has the composition $C_{21}H_{23}NO_4$, and is stated to be very similar to berberine. The authors call it

Artarine, from the common name of the drug, "Artar-root." A compound having the composition of cubebin was likewise isolated. The transverse section of the root is yellowish, with white dots. The wood is hard, and has fine wavy medullary rays.

Xanthoxylum Naranjillo, DeCand., is used as a sudorific and diuretic in the Argentine Republic. Parodi has found in it a volatile oil and an alkaloid.—Amer. Jour. Pharm., April 1890, 177.

Peganum Harmala—Medicinal and Economic Uses.—John R. Jackson draws attention to a plant which is of some interest, both on account of its antiquity and of the varied properties ascribed to it in the East. The plant belongs to the natural order Rutaceæ, and is known to botanists as *Peganum harmala*. It is an herbaceous plant, and is found in north-western India, from Scinde, the Punjab, and the Kashmir plain, to Delhi and Agra; and in the western Deccan. It is distributed over Soongaria, Arabia, northern Africa, and westward to Hungary and Spain. The seed is known in India as Hoormul, Hurmul, or Harmal; in Arabia, as Isband or Ispand—the former name of which is also known in Persia. Dymock says the seed is imported into India from Persia. Harmala seeds have long held a place in eastern materia medica as a stimulant, emmenagogue, and anthelmintic. They are introduced into the Pharmacopœia of India among the non-officinal substances. Mild narcotic properties have been assigned to them, and according to Kæmpfer, delirium characterized by cheerfulness follows their use in some cases. Dr. Landerer says their properties appear to be narcotic, and to resemble those of *Cannabis*. The Turks macerate the seeds in sherbert or bosá, administering the infusion internally. The plant is also applied in the form of cataplasm in painful disorders of the stomach. It likewise serves in the preparation of a yellow dye. Dr. Stewart says that the burned seeds are in some places applied to the cut navel-string and other wounds. Bellew states that in the Peshawur valley they are burnt near the sick to keep off evil spirits at night and to avert the evil eye, that a decoction of the leaves is given for rheumatism, and the powdered root, with mustard oil, is applied to the hair to destroy vermin. A similar account of its uses is given in "Punjab Products," where it is said to be used principally as a fumigatory agent to avert evil influences, especially when any person is present suffering from wounds, ulcers, or abscesses.

Also used in special diseases and in weakness of sight and retention of urine. The plant is considered proper only for sweepers and not to be touched by Sikhs or Hindus; but the seeds are burned on a fire if any person enters the room who may have any discharge which could render him unclean.

As to the dyeing properties of this seed, the jury of an exhibition of Punjab products reported that a principle called *harmaline* had been extracted from them, used in black and brown dyeing, for which reason they were worthy of notice. Lindley says that the Turks use the seeds as a spice and for dyeing red.—Chem. and Drugg., April 12, 1890, 514.

BOMBACEÆ.

Cream of Tartar Fruit—Source and Examination.—E. J. Millard communicates the results of a proximate examination of the pulp of specimens of the so-called "cream of tartar fruit" from Pretoria, South Africa. The "cream of tartar tree" is stated in the text books to be *Adansonia Gregorii*, a native of North Australia, but there is no evidence that this species is indigenous to or has been introduced into South Africa; and though the author's results of the chemical examination correspond to those of the examination of baobab fruit,

Adansonia Gregorii, made by F. L. Slocum in 1880 (see Proceedings 1880, 169), it is the opinion of E. M. Holmes that the present specimens are derived from

Adansonia Madagascariensis, Baillon.—The fruits examined were about the size of small cocoa-nuts, with smooth and exceedingly hard and moderately thick pericarps. They weighed 222.4 and 176 grams respectively. On sawing open the fruits the seeds were discovered imbedded in dry pulp, arranged in nine loculi. The pulp weighed 66.7 grams in the one and 57.3 in the other. It was of a pale brown color, with a slight acid and sweetish mucilaginous taste and a fruity odor. Under the microscope was seen a small amount of crystalline substance, but no starch cells. The numerous seeds were reniform, the testa being hard and dark colored. The average weight of each seed was 0.487 gram. An analysis of the pulp yielded the following data:—

Moisture	Per cent.	12.26
Ash { Soluble in water 4.1 Insoluble 1.27 }	"	5.37
Petroleum ether extract	"	0.24
Alcoholic extract	"	4.75
Aqueous extract	"	54.33
Alkaline extract	"	5.07
Insoluble residue	"	16.23

The following were the proximate constituents of the pulp, as far as were ascertained:—

Petroleum ether extract	per cent.	0.24
Phlobaphene	"	1.02
Glucose	"	7.85
Gum and plant mucilage	"	41.20
Tartaric acid	"	0.08
Acid malate of potassium	"	9.98
Metarabin and coloring matters	"	5.07
Cellulose and fibre	"	16.23
Moisture, salts, etc.	"	18.33
		100.00

Some time ago Heckel and Schlagdenhauffen had published their chemical research upon the baobab fruit from *Adansonia digitata*, the pulp of which they found to contain tartaric acid and cream of tartar: Slocum's baobab fruit was obtained from the Orange Free State, and is referred by Prof. Maisch not to *A. digitata*, but to *A. Gregorii*, though there is no evidence that his opinion was based upon a comparison with an authentic specimen of the latter. Mr. Millard's results show that the fruit examined by him differs very materially in its composition from that of the baobab fruit examined by Heckel and Schlagdenhauffen, for it contains no cream of tartar whatever.—Pharm. Jour. and Trans., April 12, 1890, 829–830.

STERCULIACEÆ.

Kola Nuts—Use in Western Africa.—Captain Binger, a French explorer, in an interesting account of his trip to the Kong and Samori regions, speaks of the use of the kola nut by the natives of Western Africa, as follows: "The natives are very fond of the fruit. Some of them say it promotes sleep, others that it prevents it; some that it quenches, and others that it produces, thirst. But however it may be, the fruit is certainly a luxury to be offered as a mark of great friendship, and the acme of politeness for a native is, on shaking hands, to cut a kola-nut in two, to offer one half to the guest, and to eat the other half himself. The tree will not grow in latitudes higher than 7° 30′. Yet the principal market is in Ouorodougou, where the tree does not grow, and no foreigner is allowed to intrude. When a dealer comes in with salt to trade for kola, he is stopped at the frontier, told how many nuts he will be given against his salt, and if the terms are agreed to the fruits are sent for, the bargain executed, and the dealer dismissed, as certain families have a trade monopoly, guarded with jealous care. Further to the east, in the regions south of Kong, the kola trade is comparatively free, as the nut is cultivated there, the natives being, by exception, willing to take the trouble to plant a tree. It should be said that since no crop can be expected for ten or fifteen years after planting, and the blacks are in general too lazy and too improvident to foresee so far ahead, the country alluded to was the only one where I saw kola cultivated, and the trees are there planted in quincunxes, and taken care of. The nuts are packed in a leaf resembling lotus, and the packing material is itself the object of important transactions. Some traders will travel to places distant fifteen days' journey to obtain the right sort of leaf, as kola will not keep unless packed in the proper variety of material."—Chem. and Drugg., March 29, 1890, 434.

Sterculia Gum—Similarities and Distinctions from Tragacanth.—The existence of a gum on species of *Sterculia* has long been known. It has been recorded from India, Africa and Australia, but with the exception of Flückiger's research in regard to an African species, and some general experiments with the India *S. urens*, nothing appears to be known in regard to them. J. H. Maiden now records some experiments and observations on the gums of Australian and also of an Indian species, in the course of which the author has discovered that they are composed essentially of *pararabin*, and also to show the incorrectness of the idea that they are similar to tragacanth, except in some superficial characteristics. In the course of his experiments, the author repeated the whole of Giraud's experiments on tragacanth (see Proceedings 1875, 361), and obtained with tragacanth all the general results recorded by that chemist. He then repeated the experiments, with substitution of *Sterculia* gum for tragacanth, and he presents his results in the form of comparative statements:

SIMILARITIES—QUALITATIVE.

1. Horny texture.
2. They swell enormously in water.
3. The jellies redden litmus.
4. They dissolve on prolonged boiling in a large quantity of water.
5. They dissolve on boiling in dilute hydrochloric acid.

QUANTITATIVE.

6. They contain about 20 per cent. of water.

DISSIMILARITIES—QUALITATIVE.

	Sterculia.	Tragacanth.
7. In cold water.	*a.* Colorless. *b.* Granular jelly. *c.* Adhesiveness absent or very small.	*a.* Opalescent. *b.* Smooth viscid mass. *c.* Adhesive.
8. Boiling in dilute alkali.	Insoluble.	Almost entirely dissolves.
9. Caustic soda and warming.	No change of color.	Canary-yellow color which fades on cooling.
10. Boiling in dilute acid.	Soluble, forming arabin [J. H. M.]	Soluble, forming pectin [Giraud].
11. Alcohol added to liquid formed in (10).	Whitish precipitate. (See fuller statement.)	Formation of floating glairy mass.

QUANTITATIVE.

	Sterculia.	Tragacanth.
12. Specific gravity.	*S. urens*, 1.49. *S. diversifolia*, 1.472.	1.384 [Watts' "Dict. and Encyc. Britt."]
13. Soluble gum.	Arabin (chiefly). *S. urens*, 3.14 p. c. *S. diversifolia*, 9.88 p. c. *S. rupestris* 6.9 p. c.	"A mixture of different bodies, and not a definite principle, like arabin." 8–10 per cent. [Giraud]. 7.7 p. c. [J. H. M.].
14. Insoluble gum.	Pararabin. *S. rupestris*, 63.42 p. c. *S. diversifolia*, 61.74 p. c. *S. urens*, 75.1 p. c.	"Pectic compound." 60 p. c. [Giraud].
15. Starch.	None.	2–3 p. c. [Giraud].
16. Ash.	*S. rupestris*, 9.0 p. c. *S. diversifolia*, 8.195 p. c. *S. urens*, 5.83 p. c. *S. tragacantha*, 7.8 p. c. [Flückiger]. The author finds 5.46 p. c. of ash in *Cochlospermum Gossypium.*	3 p. c. [Giraud]. 3–24 p. c. (mean of some experiments by J. H. M.) The author believes in the general accuracy of Giraud's figures, but the difficulties of making an accurate determination are enormous. This explains the fact that no two observers obtain the same figures.

Respecting the distribution of species the author states that there are 31 described in the "Flora of British India," several species in the "Flora of Tropical Africa," and 12 species by Bentham as occurring in Australia. East Indian sterculia gum appears to be collected exclusively from *Sterculia urens;* African sterculia gum from *S. Tragacantha;* and Australian sterculia gum from two species, namely *S. rupestris* and *S. diversifolia.* The average composition of Indian and Australian sterculia gums is given by the author in a table as follows:

	Rupestris.	Diversifolia.	Urens.
Soluble in cold water (chiefly arabin)	6.9	9.88	3.14
Pararabin	63.42	61.74	75.1
Moisture	20.52	20.2	16.6
Ash	9.015	8.195	5.83
	99.855	100.015	100.67

The author's discovery of pararabin in *Sterculia* gum really confirms Flückiger's figures obtained by combustion of the gum of *Sterculia Tragacantha.* His percentage results are practically identical with the generally accepted figures for arabin, *ergo*, for pararabin, and his experiments are additional evidence to show the general similarity of *Sterculia* gums.

The adhesiveness of that of *S. Tragacantha* is very remarkable, and further information on the subject is desirable. It would be particularly interesting to know the percentage of arabin.

The author cannot, at present, see any commercial future before gum of the Australian species; the same conclusion has long since been arrived at in regard to those produced by India ones; in regard to an African species we have the experiments of Flückiger.—Pharm. Jour. and Trans., Nov. 16, 1889, 381–385.

TILIACEÆ.

Linden Leaves—Occurrence of a Glucoside, "Tiliacin," which see under "Organic Chemistry."

Maqui Berries—Use for Coloring Wine.—The "Kew Bulletin" (Feb. 1890, 35) contains a note on the use of maqui berries for coloring wine. These fruits are the product of a small evergreen shrub,

Aristotelia Maqui, growing in Chili, where the greenish-white berries of a variety of the plant, and not the ordinary dark-purple berries, are mixed with grapes for making wine. The fruits are also eaten fresh or preserved. During the past few years large quantities of maqui berries have been exported from Chili, chiefly to France, for the purpose of coloring wines, for which elderberries had been previously used. This new coloring matter is therefore worthy of chemical examination, if only with the view of obtaining some distinctive test for its presence in wine.—Pharm. Jour. and Trans., March 1, 1890, 711.

TERNSTRŒMIACEÆ.

Tea—Cultivation in the U. S. and Assay of Commercial Sorts.—John Hamilton Small has gathered some information regarding tea culture in the United States, which it is believed will play, in the future, an important part in the agricultural interests of this country. The greatest obstacle seems to be the cost of labor to properly pick the leaves and to prepare them for the market. The tea plant will endure a much lower temperature than is generally supposed; but the sudden changes of our climate prevent it from being grown north of Maryland, while farther south it thrives quite well.

Eight commercial samples of tea were examined with the following results, the alkaloid being estimated by the process of Paul and Cownley (see Proceedings 1888, 362, and 1887, 333–334).

Commercial Name.	Color.	Theine.
Japan, uncolored	greenish black	1.79 per cent.
Japan, colored	bluish green	2.30 "
India, fine white top	black	3.54 "
Foochow	black	3.40 "
Young Hyson	bluish green	3.26 "
Congo	black	3.52 "
Chinese Imperial	bluish green	2.85 "
Formosa	black	2.38 "

—Amer. Jour. Pharm., March 1890, 123.

ERYTHROXYLACEÆ.

Erythroxylon Coca—Examination of Leaves Grown in India.—C. J. H. Warden has examined samples of coca leaves grown in various districts in India; the mode of culture, altitude and meteorological characters of the district, the kind of soil and manuring, and the methods of curing, being taken into consideration. The alkaloid was estimated by Squibb's modified method (see Proceedings 1885, 325), the following being the results:

District where grown.	Moisture.	Per cent. dry leaves.	
		Ash.	Crude alkaloid.
Ranchi, young leaves	6.18	6.71	1.139
" " mature leaves	8.22	8.99	0.883
Arcuttipore, Cachar	6.08	7.39	1.369
" "	6.72	6.36	1.671
Darjeeling	10.37	7.58	1.115
Alipore, Calcutta	10.42	10.23	0.358
Matelli	9.30	12.18	1.022
Chulsa, Dooars	5.71	7.62	0.610
Jaunpore	10.05	12.64	0.571

The author further observes that the alkaloid in the leaves increases with the age of the plants (which attain a height of from 2 to 6 feet) up to 10 years, and after 20 years a slight falling off is observed, although they are in their prime even when 35 or 40 years old. From the results obtained by the author, it would seem that, in India, neither altitude nor rainfall has much influence on the proportion of alkaloid in the leaves. The ash, in all cases except one was white, the exception being an ash of a reddish hue from mature Ranchi leaves. A partial examination of some of the ash showed that they contained the following percentages:

Samples from	Soluble Constituents.	K cal. as KHO.
Darjeeling	44.42	29.26
Alipore, Calcutta	34.60	19.13
Arcuttipore, Cachar	59.02	29.84
Matelli	64.17	31.36

—Amer. Jour. Pharm., July 1889, 358–359; from Jour. Chem. Soc.

MELIACEÆ.

Cocillana—Expectorant Properties.—A species of *Guarea*, known as *cocillana*, has recently been lauded as an expectorant somewhat similar to ipecac in its effects, and to possess also valuable tonic and laxative properties. The genus comprises about 70 species, 3 of which have in former times attracted attention on account of their asserted purgative and emetic properties and their supposed usefulness in various chronic diseases. *Guarea trichiloides, Lin. G. Swartzii, De Cand.*, and *G. purgans, St. Hil.*, are small trees of which the bark has been mainly employed.—Amer. Jour. Pharm., April 1890, 178.

Chloroxylon Swietenia—Physiological Properties.—E. M. Holmes states that the bark of this plant possesses astringent properties, but does not appear to be much used in Indian medicine. The tree yields the Satinwood of India.—Pharm. Jour. and Trans., Feb. 15, 1890, 660.

Cedar Gum—(Cedrela australis, F. v. M.)—Characters, etc.—J. H. Maiden has examined the gummy exudation of the "Cedar" or "Red Cedar" of New South Wales and Queensland, which plant has by Baron von Mueller been created a new species, viz., *Cedrela australis*, F. v. M. This gum is described by the author as being pale yellow, almost colorless, and in thin tears about an inch long. Between the teeth it almost feels leathery. It swells up largely in cold water, but in the course of twenty-four hours it nearly wholly dissolves, forming a solution colorless and faintly cloudy, like good gum arabic, and leaving a small percentage of metarabin.

It is one of the gums which form a connecting link between the arabin group,—those gums which dissolve almost immediately in water, and the metarabin group—those which merely swell up in that liquid. It forms a fair mucilage, and on account of its freedom from color it would be a valuable commodity if obtainable in any quantity. An analysis gave the following result:—

Arabin	68.3
Metarabin	6.3
Hygroscopic moisture	19.54
Ash	5.16

It is a true gum, without so much as a trace of resin.

Speaking of East Indian species of *Cedrela*, the author, after briefly describing what is known regarding their gummy exudations, expresses the opinion that the balance of probability is largely in favor of the exudation from the Indian species being a gum and not a resin.—Pharm. Jour. and Trans., June 28, 1890, 1063–1064.

SAPINDACEÆ.

Guarana—Value in Chronic Diarrhœa.—Dr. J. Frazer Boughter has successfully used powdered guarana in a case of long-standing diarrhœa, and suggests its trial in cases of diarrhœa, particularly those occurring during summer.—Amer. Jour. Pharm., Feb., 1890, 69–70.

POLYGALACEÆ.

False Senega Root—Origin.—Prof. J. M. Maisch contradicts the statement that has erroneously been made by several authors in recent years, that he considers *Polygala Boykinii* to be the source of the so-called "Southern" senega of commerce (Amer. Jour. Pharm., 1890, p. 381.) Regarding the "false" or "white" senega, he has now been placed in possession of specimens of a plant from Kansas, through a New York firm, which on examination seemed to be

Polygala alba, Nuttall; the root to which the numerous stems are attached is fully four inches in length, and, beneath the crown, one-fourth inch in diameter. On comparing it with a number of specimens in several herbaria, the roots of the latter, when present, were found to be considerably smaller, more slender and less branched. The resemblance of the specimen with senega root, notwithstanding the absence of the keel, suggested the plant possibly to be a variety of the latter species with linear leaves; but the narrow-leaved specimens of true senega were observed to differ essentially in the root, leaves and flowers. Not having the means to remove every doubt, the author deemed it advisable to consult some of the best judges of the flora of the western states, whose testimony, which is recorded in the present paper, seems to support the view that the plant yielding this drug is in all probability the variety of *P. alba* designated by Torrey and Gray as

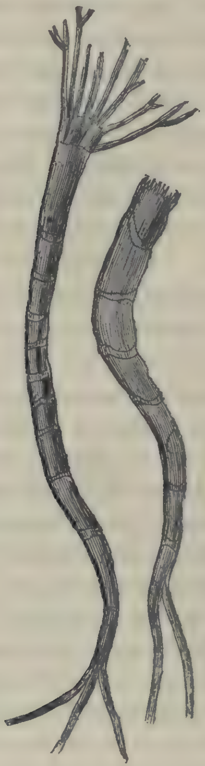
Polygala Beyrichii.—Regarding the distribution of *P. alba*, Nuttall states that it is common "on the plains of the Missouri" and "in the upper part of Louisiana." Nuttall had explored the country along the Missouri river in 1810, when the territory of Louisiana extended northward to the British possessions. From these northern plains the species extends southward to Texas and into Mexico. It is but natural to expect considerable variation in a plant indigenous to such a large portion of the North American continent, and that these variations should apply not only to the size and shape of the stem and leaves, but likewise to the underground portion. A sample of this false senega, received from the same New York firm, presents essentially the same characters with the false senega that has been observed in commerce since 1876, except that some samples of the latter are somewhat darker in color; and the following description of the present sample applies, therefore, with the variation mentioned, to all the samples seen during the past thirteen years:

Commercial false senega consists of but little broken roots, the total length of which varies between four and six inches. The head has a close resemblance to that found in senega root, is about five-eighths inch, sometimes an inch, in thickness, and bears above a large number of stem remnants. Beneath the head the root is suddenly contracted to the thickness of about one-fourth inch; a few small roots may usually be picked out, scarcely one-eighth inch in thickness, while some larger roots are three-eighths, or rarely one-half inch thick. The color is pale brownish-yellow, much lighter than commercial senega is usually seen, and lighter than all other officinal roots, the white ones excepted; since the interior of the root, both bark and meditullium, is of a nearly white color, it is obvious that in bulk the color of false senega root must have a still lighter tint, approaching to white, in proportion to the abrasion of the outer layer. Older roots, particularly near the head, have a thin layer of cork of about the same shade of brown as gentian. The main root is nearly straight, and the six or eight thinner branches are descending or curved downwards, while true senega very frequently divides into almost horizontally spreading branches. The keel is absent; slight indications of it are very rarely observed, and only in the thickest roots, near the head; but even here the transverse section of the wood has a circular outline, the same as in every other part of the root and its branches. A similar regularity, regarding the cylindrical shape of the meditullium, has not been observed by the author in the much thicker roots of northern senega; and that the typical form of senega has a cylindrical wood *only* in the part immediately below the head is well known. The author, furthermore, found the meditullium of the false senega, after freeing it completely from the bark, to be entirely tasteless, while the same portion of the northern senega has a gradually developed, decidedly acrid taste. The small roots in the sample agree well with *P. Boykinii;* but this species not growing in Kansas, cannot be present in the sample under consideration.—Amer. Jour. Pharm., Sept. 1889, 449–453.

Polygala Boykinii—Limited Distribution.—Prof. Karl Mohr, referring to the opinion expressed by L. Reuter in connection with his paper on the examination of senega root (see Proceedings 1889, 477), that the roots of *Polygala Boykinii* were possibly an accidental admixture of the true senega root of commerce, calls attention to the limited distribution of this plant. His researches in this direction seem to show that *P. Boykinii* is at best very sparingly distributed, and that it has, as far as the observations of Torrey, Gray, and other eminent botanists go, never been found north of the Tennessee river valley in Alabama; this state, and Georgia, being the only ones mentioned in which the plant is found. Accidental admixture of the roots of this plant with those of *P. Senega* is therefore out of question, while the deliberate admixture is also not to be thought of, on account of its sparing occurrence. The author says that *P. Boykinii* is a frail plant, the thin, slender stems of which extend from a root-stock, the largest specimens of which scarcely reach the size of the smallest senega roots of commerce. In other respects, odor, taste, and probably also constituents and remedial value, it corresponds well with true senega.—Pharm. Rundsch., Aug., 1889, 191.

False Senega—Constituents.—L. Reuter, accepting the view of Prof. J. M. Maisch that the false senega of the market is the root of *Polygala alba*, records the results of experiments made to determine if the chemical distinctions of true and false senega root, found by him some time ago, were applicable to authentic specimens of *P. alba* root. These results confirm his previous observations, that false senega roots contain at best only traces of salicylate of methyl, which is present in decided quantities in the roots of *P. Senega*. The false senega contained 1.067 per cent. of senegin, 0.2 per cent. of fixed oil, and 0.85 per cent. of resin, together with a peculiar fluorescent body, which requires further examination. The author also examined *Japanese senega root,*

FIG. 40.



Polygala Tenuifolia.

Polygala tenuifolia, which is quite distinct from the true as well as false senega roots of commerce. The root is flexible, frequently decidedly ringed, occasionally vermicularly bent, and of a pale yellowish-brown color. Salicylate of methyl could not be determined by the ferric chloride reaction, but it contains 0.657 per cent. of senegin, and a large percentage (8.8 per cent.) of fixed oil, together with 0.8 per cent. of resin. A fluorescent body was not observed in this variety of senega. Arch. d. Pharm., Oct. 1889, 927–931.

Krameria triandra and Krameria argentea—Comparative Examination.—R. G. Dunwody, in view of the fact that *Krameria argentea* is largely sold as rhatany root at the present time, has made a comparative examination of this and of *K. triandra,* and tabulates his results as follows :

		Krameria triandra.		Krameria argentea.	
Petroleum Ether		.40		.240	
			0.40		.240
Ether	soluble in water	.53		3.986	
	soluble in alcohol	3.09		.024	
Total			3.62		4.010
Absolute Alcohol	soluble in water	5.531		3.04	
	insoluble in water	17.485		9.60	
Total			23.016		12.64
Distilled Water	Tannin	1.360		1.570	
	Extractive	.368		.368	
Total			1.728		1.938
Alkaline Extract	Pectin	1.320		1.500	
	Extractive	5.490		7.420	
Total			6.810		8.920
Acid Extract	Pararabin	.160		.810	
	Extractive	1.731		.018	
Total			1.891		.828
Boiling Water	Starch	.559		.520	
	Extractive	2.637		1.280	
Total			3.196		1.800
Moisture		11.256	11.256	11.947	11.947
Ash		2.445	2.445	2.785	2.785
Residue Cellulose and Lignin		44.345	44.345	53.118	53.118
Loss		1.293	1.293	1.774	1.774
		100.00	100.00	100.00	100.00

The total amount of tannin in the two drugs was 8.4 per cent. in *K. triandra* and 7.2 per cent. in *K. argentea.* With the usual reagents these tannins gave the same reaction, with the exception that the tannin from *K. triandra* gave with ferric acetate a *bluish*-green precipitate, while that from *K. argentea* gave an *olive*-green. The valuable constituents of the two drugs, as appears from the above, are essentially the same, but in slightly smaller quantity in the argentea variety of rhatany.—Amer. Jour. Pharm., April 1890, 166–167.

FUMARIACEÆ.

Fumaria officinalis—Preparation and Characters of its Alkaloidal Constituent—Fumarine, which see under "Organic Bases."

PAPAVERACEÆ.

Papaver Rhœas—Absence of Morphine in the Flowers.—Referring to a recent observation of E. Dieterich that the flowers of *Papaver Rhœas* contained from 0.17 to 0.7 per cent. of morphine, O. Hesse gives preliminary notice that he has operated upon larger quantities of these flowers, and obtained small quantities of a crystalline alkaloid, which, however, proved to be distinct from morphine. They are insoluble in dilute soda, dissolve in dilute sulphuric acid, and the solution is colored red on boiling, but less intensely than a solution of rhœadine. The crystals contained a little rhœadine, but appear to consist mainly of a new alkaloid, which has as yet not been further examined for want of material.—Archiv d. Phar., 1890, No. 1, 7–9.

Boston (or Pudding) Opium—Source and Characters.—Dr. E. R. Squibb has secured information through correspondents in the original opium market respecting the form of opium, which is known in commerce as "Boston" or "Pudding" opium, and which is characterized by its superior uniformity in appearance and by its uniform morphine percentage, viz., 9 per cent. It appears to have been originally made for a reputable Boston firm by reducing the strength of natural opium of good quality by adulteration with foreign matters until it would pass the assay process of the U. S. Custom House (9 per cent. morphine); and the Turkish agents have in the course of their experience succeeded in producing a very handsome opium of uniform consistency and divided in handsome lumps of uniform size. Though only cheaper than natural opium to the amount of about 15 per cent. per pound, and while the latter will contain as high as 14 per cent. or more of morphine, it is generally preferred by dealers to natural opium.—Ephemeris, July, 1889, 1161–1162.

Opium—Further Improvements of Squibb's Process of Assay.—With the view to bringing his process of opium assay up to the present time, Dr. E. R. Squibb communicates further improvements on his previously published method (see Proceedings 1882, 229, and 1888, 372), as the result of his investigation and experience since then, in an exhaustive paper, and he believes that he has now eliminated the serious error inherent to all previous methods:

1. *Sampling.*—Every fifth lump of a case of opium—excepting the very small lumps, and every tenth lump of these—is separated for sampling. A cone-shaped piece is cut from each of these lumps, the apex of the cone to come from the center of the lump. As these are cut out, a small, narrow strip is cut from the side of the cone, taking about an equal proportion from its whole length so as to get a proper relation of quantity from the dry exterior to the moist center. These strips as taken are collected together in a mass so as to lose but little moisture by drying, and the cones are returned to the lumps. This mass is rolled out into a cylinder, the two ends doubled in the center and rolled out again—this rolling out and folding in being repeated six times: a weighed quantity of starch, which is

afterwards taken into account, being used for rolling out if the opium is very moist and sticky. Two portions, each representing 10 grams of the opium, are then weighed off from the mass. One of these is flattened out into a thin cake, placed on a tared watch-glass and dried to constant weight at 100° C., for the determination of moisture and a check assay; the other is taken for the assay. (In the case of *powdered* opium, these two portions are weighed off direct for the same purposes.)

2. *Maceration.*—The 10 grams of mass is pulled out and broken into thin pieces, and dropped into a flask of 200 c.c. capacity; 100 c.c. of water added; the whole occasionally well shaken, and allowed to stand over night; then again well shaken. (With *powdered* opium, maceration for an hour or two is sufficient.)

3. *Exhaustion.*—The well-shaken opium mixture is carefully poured in the center of a well-wetted, tared filter of strong paper, of 12 c.m. diameter, so folded that the lower part of the cone hangs free in the funnel—that is, folded for a rather more open angle than that of the funnel used. The filtrate is received in a beaker marked at 150 c.c., and the flask and residue are well washed with water until the filtrate reaches the 150 c.c. mark. By means of a spatula the residue is returned to the flask without breaking the filter; 50 c.c. of water is added, the whole is actively shaken for five minutes, and is then returned to the filter, being carefully poured in the center, so that in draining the residue may be of equal thickness on all sides. This second filtrate is received in a second beaker marked at 150 c.c., and the residue is percolated and washed until the filtrate reaches the mark. In both percolations a large part of the water is dropped from a pipette at a height of 12 to 15 c.m. upon the edges of the filter and surface of the residue. The drained filter and residue are pressed between folds of bibulous paper, dried at 100° C. to constant weight, and the weight of insoluble residue thus ascertained.

4. *Evaporation of the Solution.*—The weaker solution is evaporated first in a tared capsule of 250 c.c capacity, on a water-bath to about 10 c.c. The stronger solution is added to this and the evaporation continued until the whole is reduced to 14 grams. This is rinsed round the capsule by a rotary motion until all the rings of extract formed during the evaporation are dissolved, and it is then poured into a tared flask of 100 c.c. capacity. The capsule is then rinsed with three rinsings of about 2 c.c. of water each time, and finally with enough water to make the entire solution in the flask weigh 20 grams.

5. *Precipitation.*—To the 20 grams of concentrated solution is then added 10 grams of alcohol of not less than 91 per cent. (=s. g. 0.815), and the mixture is well shaken. Then 17.5 grams of ether of not less than 93 per cent. (= s. g. 0.725) is added, and the mixture again well shaken. To this 3.5 grams of water of ammonia, s. g. 0.960, is added, and the mix-

ture is vigorously shaken for 10 minutes, and the flask is then set aside over night, or for not less than 6 hours.

6. *Separation and Washing.*—The ether layer is poured off as closely as possible, and 20 c.c. of fresh ether is added to the contents of the flask, rinsed round without shaking, again poured off as closely as possible, and this treatment with fresh ether is repeated twice. A pair of counter-balanced filters 9 c.m. in diameter, folded at an angle slightly wider than the funnel, and well wetted with ether, then receive the contents of the flask, the upper ether layer being slowly poured in first so that it may pass through before the paper becomes wetted with the watery solution. When the liquid has nearly drained through from the crystals on the filters, those from the flask are washed out onto the filters by repeated portions, about 3 c.c. at a time, until all the crystals are upon the filters. Then water is applied drop by drop, from a pipette held 8 or 10 c.m. above the funnel, to the edges of the filters and surface of the crystals, until they are fairly clean and the mother liquor and washings do not exceed 50 c.c. Then 5 c.c. of a saturated solution of morphine in 91 per cent. alcohol is dropped from a pipette first upon the filters (crystals? Rep.) and then upon the edges of the filters, so as to displace all the watery solution and leave them saturated with the alcoholic liquid. Then before this has time to dry it is displaced by dropping on, in the same way, 5 c.c. or more of ether. When this has drained through, the filters are closed together upon the crystals, in the original folds, and pressed between folds of bibulous paper, under weights, for half an hour. The filters are then opened, and when the morphine is spread out upon the inner one they are dried at 60° C., until they cease to lose weight. This is the crude morphine, and if a small portion of it is found to be entirely and quickly soluble in one hundred times (or more) its weight of lime water, the weight of the morphine multiplied by 10 is accepted as the percentage of morphine yielded by the opium.

7. *Correction or Control of Results.*—When the preliminary testing of a small quantity of the precipitate shows that it is not entirely soluble in lime water, 0.5 gram is weighed off, put into a graduated cylinder, and 50 c.c. of lime water is added, by pouring down the side of the inclined cylinder. The contents of the cylinder are then tilted backward and forward without shaking, so as to avoid the formation of froth on the surface, until all that is soluble is dissolved. The solution is then filtered through a pair of counter-balanced filters about 7 c.m. in diameter, and the filters and residue are well washed, first with 5 c.c. of lime water, and then with 5 c.c. of water, and when drained they are closed up, pressed between folds of bibulous paper, dried until they cease to lose weight at 100° C., and weighed. From the weight so ascertained the amount of impurity is calculated in the usual manner, and the correction applied to the previously determined weight of morphine. In general practice, perhaps nineteen

times out of twenty the lime-water testing will show an insignificant amount of insoluble residue, and then the assay process may well end there, as far as its practical value goes.

A method of titration of the morphine in lime-water solution, applicable in exceptional cases and unusual varieties of opium, is also given by the author, whose paper abounds with profuse comments and explicit directions respecting the successive steps in the process, for which reference must be had to the original paper in Ephemeris, July 1889, 1150–1161.

Opium—Improved Process of Assay.—Prof. F. A. Flückiger, after discussing the source of error in his own process of assay (see Proceedings 1882, 229) as well as the objections to others, remarks that while the experiences and views propounded in his paper require completion in various directions, they are sufficient to base upon them a method of opium assay which may be designated as good. If it can be rendered still more perfect, so much the better. The process then is as follows:

Introduce 8 gm. of powdered opium (of a degree of fineness to be fixed upon later) into a folded filter of 12 cm. diameter, tapping the filter [to make the powder settle evenly], and dry the whole at 100° C. After half an hour, pour upon the powder a mixture of 10 c.c. of ether and 10 c.c. of chloroform and frequently tap the funnel, which should be kept covered, [to cause the solution to flow down]; finally add 10 c.c. more of chloroform. Cause as much of the fluid to drop off as possible, then spread out the filter and dry it, with its contents, at a very gentle heat. Transfer the powder to a flask, shake it (whether it has caked together or not) with 80 gm. of water repeatedly and forcibly, and filter after two hours. (There is no objection to add to the water, previously, 0.2 gm. of ammonium oxalate, but two hours will scarcely be sufficient to precipitate all the calcium.) Transfer 42.5 gm. of the filtrate into a flask of known weight, add 7.5 c.c. of alcohol (specific gravity 0.830), 15 c.c. of ether, and 1 c.c. of water of ammonia (specific gravity 0.960), and shake repeatedly and briskly. After six hours transfer the contents of the flask upon two plaited filters, folded together, and of 10 cm. diameter, and transfer as much of the morphine as possible upon the filter, by washing, using about 10 c.c. of water. Dry the filter first at a gentle heat, lastly at 100° C., and then transfer the morphine back into the flask, which has meanwhile also been dried at 100° C. Finally determine the total weight of morphine, when it remains constant at 100° C.

If the mixture of 42.5 gm. of liquid extract, 7.5 c.c. of alcohol, 15 c.c. of ether, and 1 c.c. of ammonia, is allowed to stand quietly for six hours, the quantity of morphine obtained is less. At one time, for instance, it was 11.71 per cent. By very active shaking, however, as much as 14 per cent. could be obtained from the same opium. But in this case the morphine was not sufficiently pure. Moreover, in this experiment the remainder of the filtrate was used, from which the above 11.71 per cent. had first been obtained.

When 8 gm. of opium, after being treated with chloroform, are mixed with 80 gm. of water, the amount of filtrate which may be collected will be about 73 gm. If the first 42.5 gm. of this are taken for an assay, and the morphine in the second portion of the filtrate (30.5 gm.) is also determined, the latter will seldom be as handsome as that obtained from the first or main portion.—Amer. Drugg., October 1889, 191–193; from Arch. d. Pharm. 1889, 721–732.

Chelidonium—Constituents of the Root.—According to E. Schmidt the root of *chelidonium* contains chelidonine ($C_{20}H_{19}NO_5 + HO_2$), chelerythrine, and a number (about a dozen) of other alkaloids. From the raw alkaloid of Merck he isolated three further alkaloids, α- and β-homochelidonine and protopine. The latter alkaloid has also been found in *Sanguinaria canadensis* (besides a number of others) *Stylophorum*, and *Eschscholtzia californica* (previously taken for morphine in this plant). The chelidonium alkaloids resemble morphine in physiological action. The stylophorine, from the root of *Stylophorum diphyllum*, is identical with chelidonine.—Amer. Jour. Pharm., Jan. 1890, 12; from Pharm. Centralh., 1889.

Stylophorum diphyllum—Alkaloidal Constituents.—F. Selle also finds stylophorine to be identical with chelidonine (see above). Besides this he isolated from *Stylophorum diphyllum* another alkaloid, crystallizing in needles, having the melting point 193–195° C., and giving the following color reactions: with Frohde's reagent. (sulphomolybdate) yellow, green, blue-green, dark-blue, blue-green; with Erdmann's reagent (H_2SO_4 + trace of HNO_3) yellow, bright-green, becoming blue from the circumference, the liquid soon however assuming a dirty green color; with Mandolin's reagent (sulphovanadate), green, blue-green, bright-blue (lasting a long time), then dark blue-green. A body similar to chelerythrine or sanguinarine was recognized by the fluorescence of the ethereal solution of the free base and the red color of its salts. This alkaloid shows the following reactions: with concentrated sulphuric acid first yellow, then greenish and lastly red-brown; with corrosive sublimate an orange-colored precipitate. The author's results of the analysis of the root of *Chelidonium majus* are in the main the same as those obtained by E. Schmidt.—Amer. Jour. Pharm., April, 1890, 175; from Ztschr. f. Naturwiss., 1889, 269–320.

Eschscholtzia californica—Constituents.—According to L. Reuter this drug contains two alkaloids and a glucoside. One of the alkaloids,

Protopine, which is widely distributed through the *Papaveraceæ*, has, according to E. Schmidt (Chem. Centralh., 1889, ii, p. 579), a physiological action similar to that of morphine. One of the alkaloids gives a violet color with sulphuric acid.—Amer. Jour. Pharm., Jan. 1890, 12; from Pharm. Centralh., 1889, 609.

BIXACEÆ.

Chaulmoogra Plants—Introduction at Réunion.—It is stated that chaulmoogra plants have been successfully introduced at Réunion by the director of the Botanical Gardens. The trees are reported to be very difficult to propagate, and still more so to transplant. Hence the comparatively limited area over which they are found, notwithstanding the great medicinal value of the oil extracted from the seeds. Chaulmoogra oil is probably the only known remedy that will—not cure leprosy—but alleviate it, and it is to this object that the plant owes its introduction in the Réunion island.—Chem. and Drugg., Dec. 14, 1889, 820.

CUCURBITACEÆ.

Luffa echinata, Roxb.—Examination of the Fruit.—W. Dymock and C. J. H. Warden have subjected the fruit of Luffa echinata, Roxb., to examination, and they obtained some interesting results respecting its poisonous constituent. In 1887 attention was drawn to the dangerous properties of this fruit by Dr. Kirtikar, of Bombay, one of whose servants, after taking a decoction of a single fruit, which had been recommended to him by a friend as a purgative, was attacked with symptoms resembling those of cholera, and rapidly succumbed in spite of medical treatment.

The fruit of *L. echinata* is ovoid, about the size of a nutmeg, studded with numerous long, rather soft diverging bristles; it is obscurely divided into three cells by numerous dry fibres, and closed at the apex by a perforated stopple, which falls off when the seeds are ripe. The seeds are about eighteen in number, ovate, compressed, black and scabrous, testa very hard, kernel white and free from bitterness. The fibrous substance in which the seeds are enclosed is intensely bitter. The air-dried fruit, deprived of seeds as much as possible, was digested with 80 per cent. alcohol, the greater part of the spirit removed by distillation, and the remainder allowed to evaporate by exposure to air. During spontaneous evaporation the tincture gelatinized. When the extract no longer smelt of alcohol it was gently warmed on the water-bath, water added, and when cold the turbid mixture repeatedly agitated with ether. The ether was much colored. Gelatinous flakes separated during agitation. The ethereal solution contained a large amount of chlorophyll, and after evaporation of the ether, the residue became partly crystalline. The extract was repeatedly treated with light petroleum ether, which removed some waxy and much coloring matter, and a crystalline principle, in microscopic needles and stellate masses, which was not further examined. The dark residue, insoluble in petroleum ether, was then boiled with water; the aqueous solution was slightly yellow, became turbid on cooling, and possessed an extremely bitter taste. This aqueous solution was agitated with ether. On spontaneous evaporation a yellow, transparent varnish was left, destitute of any crystalline structure. The extract treated with water afforded a white curdy precipitate with tannic acid; no precipitate with Mayer's reagent; with ferric chloride it afforded a slight greenish coloration; after boiling with dilute sulphuric acid, the solution readily reduced Fehling's solution. This principle would appear to be allied to, if not identical with, *colocynthitin*. Physiological experiments proved this substance to be highly poisonous. The seeds contain a bland oil, free from bitterness, and which possesses some siccative properties.—Pharm. Jour. and Trans., June 7, 1890, 997–998.

MYRTACEÆ.

Eucalyptus Kino—Sources, Supply, Characters, etc.—J. H. Maiden communicates a very exhaustive and interesting paper on Botany bay or eucalyptus kino—embracing the commerce, uses, collection, classification, definition of the various terms under which it is known in commerce, and characters of the various Australian kinos, from which the following is briefly abstracted: In Australia kinos are largely used in rural medicine, on account of their astringent properties, aqueous solutions being almost invariably made. Some of them are used by the settlers for ink, or for staining leather black, the process simply consisting in boiling the kino in an iron saucepan. The commerce with Europe and America in eucalyptus kino has never been important. Wounding the bark stimulates the flow of kino in some cases, but such a practice does not appear to be systematically resorted to. Usually it is collected from the outside, which accounts for its occasional admixture with particles of bark, but sometimes it is contained between the concentric layers of the wood (chiefly in the case of *E. corymbosa*). In the latter case it has communication with the outside of the tree, though frequently the passage is blocked with indurated kino, which has to be removed to enable the store inside to be drawn off.

The eucalypts are popularly known in Australia as "gum trees," but certain species from the structure of their bark are called "iron-barks" and "stringy-barks." The "gums" are locally distinguished as red, white, blue, and by other adjectives. The adjective is in one district employed to describe the leaves, in another the bark, and so on. Thus a "white gum" may be intended to denote a tree with white leaves, white bark, etc. The variations in some trees in different localities, due to climate, soil, and similar causes, are sufficient to render terms like "white gum," etc., which may in some way describe a species in one district, totally inapplicable in another.

The author has experimented with a large number of kinos. In all cases he has made the tinctures of the strength of tinct. kino, B. P., and he finds that according to their behavior in alcohol they are easily classified into three groups, which he has called the Ruby group, the Gummy group, and the Turbid group respectively.

a. Ruby Group:—

E. amygdalina, Labill.
E. eugenioides, Sieb.
E. hæmastoma, Sm.
E. macrorrhyncha, F. v. M.
E. pilularis, Sm.
E. piperita, Sm.
E. Sieberiana, F. v. M. (syn. E. *virgata*, Sieb.).
E. stellulata, Sieb.
E. melliodora, A. Cunn.
E. obliqua, L'Her.

In the preparation of a tincture all the above kinos tend to dissolve entirely, forming clear ruby solutions of approximately the same tint. They also form clear ruby solutions to cold water, hardly differing in appearance from the tinctures. The aqueous solution of the alcoholic extract is similar in appearance. Members of this group are not very friable, breaking down into clean angular fragments, and never forming an impalpable powder. If acetate of lead or of copper be added to a moderately strong solution of these kinos, so strongly gelatinous a precipitate will be formed that the test-tube may be inverted without any liquid spilling. This distinguishes them, in one respect, from the Turbid Group.

b. Gummy Group:—

E. leucoxylon, F. v. M.
E. paniculata, Sm.
E. resinifera, Sm.
E. robusta, Sm.
E. saligna, Sm.
E. siderophloia, Benth,

In spirit, these kinos scarcely dissolve, leaving abundant granular residue of gum. Supernatant liquid perfectly clear. These kinos tend to be perfectly soluble in cold water, and age seems to have but little effect on them in this respect. They are like the Ruby kinos in not forming impalpable powders, being even tougher than the members of that group. They form gelatinous precipitates with some metallic acetates, like the Ruby group.

c. Turbid Group:—

E. goniocalyx, F. v. M.
E. hemiphloia, F. v. M.
E. rostrata, Schl.
E. punctata, DC.
E. odorata, Behr.
E. Gunnii, Hook.
E. Stuartiana, F. v. M.
E. viminalis, Labill.
E. terminalis, F. v. M.
Angophora lanceolata, Cav.
A. intermedia, DC.

The above yield orange-brown solutions.

E. corymbosa, Sm., yields solutions up to the brightest ruby.

E. microcorys, F. v. M., and *E. maculata*, Hook., yield solutions of various shades, from lemon-yellow to orange-brown.

All the members of this group yield turbid solutions to spirit, which require long standing or filtering to become clear. They behave in a similar manner to water, but become clear on boiling, indicating catechin. The aqueous solutions of the alcoholic extract are likewise turbid. They are all more or less friable, forming impalpable powders usually by pressure of the fingers. Addition of acetate of lead or copper produces only a very slight gelatinous precipitate, thus dividing them from the other two groups.

The author gives a list of those species which he has proved by experiment to be suitable for pharmacopœial purposes, and which he can consequently guarantee. Others may be added as may be determined by future experiment. This list embraces

1. All members of the Ruby group.

2. The following members of the Turbid group: *E. goniocalyx*, *E. hemiphloia*, *E. rostrata*, *E. punctata*, *E. odorata*, *E. Gunnii*, *E. Stuartiana*, *E. viminalis*, *E. terminalis*, *E. corymbosa*.

All the members of the Gummy group must be rejected. Respecting the

Gelatinization of Tincture of Kino, the author remarks that he had over seventy eucalyptus and angophora kinos in spirit (to make tinctures of B. P. strength), for periods varying from a few days to twelve months, and has drawn the following conclusions:—(1) Tinctures do not gelatinize if made from new kinos. By the word "new" is meant under one or two years old. (2) No kinos gelatinize other than the clear ruby ones. Five very old ruby kinos on which he experimented gelatinized in a month or two. (3) All kinos entirely soluble in spirit are ruby ones. Whatever the cause of gelatinization may be, or rather, whatever the substance may be which, when formed, causes gelatinization, the experiments show that no chemist need have gelatinized tincture of kino if he chooses to avoid it. Old ruby kinos should be rejected for the purpose of tincture making. In the case of a member of the Ruby group, if the kino is not completely and readily soluble in cold water, forming a clear ruby solution, with no gelatinous ruby-colored residue of phlobaphene, it should be rejected. The author has little doubt that the gelatinous-looking mass consists wholly or mainly of softened phlobaphenes. By direct experiment he has shown that insoluble phlobaphenes break down after a longer or shorter period of digestion in alcohol, and form a substance which may be likened to red-currant jelly.—Pharm. Jour. and Trans., Sept. 21, 1889, 221–222, and Oct. 26, 1889, 321–323.

Syzygium Jambolanum, De Candolle—Medicinal Value.—Dr. C. Græser has experimented upon dogs rendered diabetic by the administration of phloridzin, and ascertained that the excretion of sugar was promptly reduced from 80 to 86 per cent. by the administration of extract of jambul, concentrated so that 100 gm. of fruit were represented by 16⅓ gm. of the kernel and 11⅔ gm. of the rind extract. The dose was 6 to 18 gm. daily.—Amer. Jour. Pharm., Jan. 1890, 50; from The Lancet, Nov. 2, 1889.

Cloves—Cultivation in Zanzibar.—Consul Pratt in his report gives some interesting information respecting the cultivation of cloves in Zanzibar. When speaking of Zanzibar the island of Pembra is included, and this latter island produces three-fourths of the entire crop. The clove tree was first introduced by the then Sultan, Seyed Said bin Sultan, about the year 1830, since which time its cultivation has gradually extended, until it is now the chief industry of the islands. A peculiarity of the clove tree is that every part is aromatic, but the greatest strength is found in the bud, which is the "clove" of commerce. The finest quality of cloves are dark brown in color, with full, perfect heads, free from moisture. In the cultivation of the clove the first thing to be done is the starting of the shoot. The seeds are planted in long trenches, and are kept well watered until after sprouting. In the course of forty days the shoots appear above ground. They are carefully watered and looked after for the space of two years, when they should be about 3 feet in height. They are then transplanted, being set about 30 feet apart, and are kept watered until they become well rooted. From this time on the young trees require only ordinary care, though the best results are obtained when the ground about the trees is well worked over and kept free from weeds. The growth of the tree is very slow, and five or six years are required for it to come into bearing, at which time it is about the size of an ordinary pear tree, and is usually very shapely. It is a pretty sight to see a young plantation just coming into bearing. The leaves, of various shades of green tinged with red, serve to set off the clusters of dull red clove buds. As soon as the buds are fully formed and assume this reddish color the harvesting commences, and is prosecuted for fully six months at intervals, since the buds do not form simultaneously, but at odd times throughout the whole period. The limbs of the tree being very brittle, a peculiar four-sided ladder is brought into requisition, and the harvesting proceeds apace. As fast as collected, the buds are spread out in the sun, until they assume a brownish color, when they are put in the storehouse, and are ready for market. A ten-year-old plantation should produce an average of 20 pounds of cloves to a tree. Trees of twenty years frequently produce upwards of 100 pounds each.—Pharm. Jour. and Trans., June 21, 1890, 1040.

Artificial Cloves!—Occurrence in Austrian Commerce.—According to Dr. T. F. Hanauseck artificial cloves have been met with in Austria, composed chiefly of wheat flour and ground oak bark, to which, made into a doughy mass, is added a small quantity of ground cloves, and then pressed in suitable moulds. The regularity of this artificial product is all-sufficient to detect them if not admixed with genuine cloves; in this case they may be found only on close inspection, but the ridges due to the mould and a yellowish-brown powder found near the ridges will be abundant evidence.—Amer. Jour. Pharm., Aug. 1889, 411; from Ztschr. f. Nahrungsm. Unters., 1889, 121.

CALYCANTHACEÆ.

Calycanthus glaucus—Proximate Examination of the Seeds.—H. W. Wiley has made a proximate examination of the fruits of Calycanthus glaucus, the pods, hulls and kernels being examined separately. The results were as follows:

	Pods.	Seed Hulls.	Kernels.	
			Unextracted.	Extracted.
Moisture	9.03	11.39	5.36	3.52
Petroleum spirit extract	3.07	1.22	47.08	3.64
Ether extract	3.25	0.30	1.29	0.31
Absolute alcohol extract	1.73	0.54	9.69	17.33
80 per cent. alcohol extract.	1.87	1.09	2.48	6.33
Fibre insoluble in dilute acid and alkali	29.26	30.71	1.36	2.85
Ash	4.24	1.72	1.08	4.69
Albuminoids	5.25	2.63	23.62	42.31
Digestible fibre, starch, etc., by difference	42.26	50.40	8.05	13.00

A considerable quantity of albuminous matter is extracted by alcohol. The almost entire absence of starch is a noteworthy characteristic of calycanthus seed, a cooled decoction giving only a faint reaction with solution of iodine. The

Fixed Oil of Calycanthus, which was obtained to the amount of 47 per cent. from the kernels, has a faint yellow color and a peculiar odor. Compared with water at the boiling point, the specific gravity is .9058 for the extracted and purified oil, and .9110 for the expressed oil. It is free from volatile acids. The iodine absorption for the crude expressed oil was 129.53, and for the purified extracted oil, 128.66 per cent. The fatty acids crystallized at 12.5. The refractive index of the oil determined by the Pullfrick refractometer at 28° is 1.47351, the index of pure water at the same degree, 1.33338.

Calycanthine, the alkaloidal constituent of the seed discovered by Dr. R. G. Eccles (see Proceedings 1888, 382), was obtained to the amount of 4.25 per cent. by the following process: Digest for four days 10 gm. of the powder with 100 c.c. of dilute sulphuric acid (1 :50) at about 35° C.; make the emulsion-like mixture strongly alkaline with ammonia, shake with ether, pour off the slowly separating ethereal layer and evaporate; wash the resulting extract with about 100 c.c. of dilute sulphuric acid; free this solution from fat, etc., by washing with ether; render strongly alkaline by sodic hydrate, and shake with ether. The calycanthine separates from ether in feathery crystals, or, on slower evaporation, in triangular crystals. In addition to the beautiful green-color reaction with nitric acid, described by Dr. Eccles, the author finds that calycanthine gives a pale yellow color with sulphuric acid, a fine purple, persistent and changing to blue, with sulphuric acid and sucrose, and a fine blood-brick-red with sulphuric acid and bichromate of potassium. Calycanthus seeds contain nearly twice as much of albuminoids as wheat. The quantity of sugar (dextrose, sucrose and dextrin) is also large, and it is easy to see why the "bubby" berries are greedily sought after by cattle.—Amer. Jour. Pharm., Feb. 1890, 96–98; from Amer. Chem. Jour., Dec. 1889, 557–567.

ROSACEÆ.

Rose—Distinction of Perfume in Different Species.—In an elaborate article on "Perfume of the Rose," R. Blondel states that the odor of the rose is chiefly developed in the group *Centifoliæ*, and especially in *R. centifolia*, Mill. The group *Caninæ* possesses a similar perfume, which is, however, generally much more feeble. The hybrids produced by crossing tea-roses (*R. fragrans*, Riv.) and Bengalese roses (*R. semperflorens*, Curt.) with *R. centifolia*, give a great variety of odors; while the noisette roses (hybrids of *R. moschata* and *semperflorens*) are generally scentless. In the group *Banksiæ*, *R. Banksia alba* possesses a very pronounced odor of violets, while *R. Banksia lutea* has no marked perfume. The group *Cinnamomeæ*, with one or two exceptions, does not possess a strong odor, and the *Pimpinellifoliæ* are likewise nearly scentless. In the group *Villosæ* the flowers have but little perfume, but the leaves are glandular, and in *R. villosa*, L., emit a terebinthaceous odor. The section *Rubiginosæ* (sweet-briars) are also remarkable only on account of the peculiar perfume emitted by the leaves of several species. In the petals of the fragrant species the essential oil resides in the cells of the upper and under epiderm; its presence may be easily detected by the use of osmic acid. F. Crépin confirms the statement that the odor contained in the glands of the sweet-briar, *R. rubiginosa*, L., and of the species nearly allied to it, is totally different from that of the other species of the genus.—Pharm. Jour. and Trans., Nov. 16, 1889, 387; from Bull. of the French Botan. Soc.

Blackberry Bark—Proximate Analysis.—Gustav Adolf Krauss has subjected the root bark of *Rubus villosus* to proximate analysis, with the following results:

Treatment with

Petroleum ether.	Volatile oil	0.015	
	Wax and bitter principle	0.015	
	Fixed oil	0.230	
			0.26
Absolute ether.	Gallic acid	0.370	
	Resin soluble in alcohol	0.650	
	Resin insoluble in alcohol	0.050	
			1.07
Absolute alcohol.	Phlobaphene	0.870	
	Tannin	6.530	
	Extractive	4.100	
	Villosin	0.800	
	Glucose	0.420	
			12.72

Distilled water	Mucilage	2.260	
	Dextrin	2.500	
	Other carbohydrates	4.220	
	Tannin	4.900	
	Other compounds precipitated by lead acetate	0.550	
	Glucose	1.250	
	Saccharose	0.170	
			15.85
Soda solution	Pectin and albuminoids	0.600	
	Phlobaphene	0.800	
			1.40
Weak HCl	Pararabin, etc.	4.800	
	Starch	3.580	
			8.38
Chlorine	Incrusting matter		13.00
HNO_3 and $KClO_3$.	Intercellular matter		17.00
Residue	Cellulose and sand (1.35)		16.48
Ash			3.16
Moisture			10.60
Loss			0.08
			100.00

The most interesting result is the isolation of a glucoside, for which the author proposes the name

Villosin.—It forms fine silky needles melting at 173–175° C. to a brown mass; heated on platinum foil it melts and burns with a sooty flame, leaving no residue. It is freely soluble in methyl, ethyl and amyl alcohols, sparingly soluble in water, slightly soluble in petroleum benzin, insoluble in chloroform and nearly so in ether. The taste is bitter, best perceptible in the alcoholic solution. The aqueous solution is not precipitated by lead acetate, but yields a precipitate with lead subacetate. Villosin does not reduce silver nitrate, even on heating. Ferrous and ferric salts cause no change. Alkalies color lemon yellow. Sulphuric acid colors light brown, changing to deep violet with little water. Sulphuric with a drop of nitric acid colors deep orange, then red, by heat destroyed. Froehde's reagent colors dark brown, and on heating, brown green; but Froehde's reagent with a drop of nitric acid gives a red color. An aqueous solution, containing in 5 c.c. 0.030 gm. of the glucoside, yielded with Fehling's solution 0.020 gm. precipitate; on boiling the solution previously with dilute acid the precipitate weighed 0.024 gm.—Amer. Jour. Pharm., Dec. 1889, 605–606.

Wild Cherry—Amount of Hydrocyanic Acid in the Bark and its Preparations.—L. W. Hawkins has experimented to determine the amount of hydrocyanic acid occurring in wild cherry bark, and the proportion of this which finds its way into pharmaceutical preparations of the bark. Six samples of bark from leading houses, examined by distilling the finely powdered drug with water and titrating the distillate with centinormal silver nitrate solution, gave results corresponding to a yield of hydrocyanic acid ranging from 0.079 per cent. to 0.160 per cent. The preparations in use are the liquid extract, infusion and syrup of the U. S. P. and the tincture of the B. P. C. Formulary. Commercial specimens of the liquid extract, which is supposed to represent its weight of bark, gave very poor results, the highest quantity of hydrocyanic acid in any of six samples being 0.030 grams in 100 c.c., and in two cases none at all. A sample made by the author strictly according to the U. S. P. formula from a bark containing 0.137 of acid only contained in the finished product 0.084 per cent., apparently showing that the portion of the menstruum not subjected to the influence of heat is insufficient to extract the whole of this constituent. Commercial samples of the infusion and syrup also gave results considerably below the theoretical quantity, supposing that they were made from average quality bark, although it was demonstrated that a much nearer approximation could be obtained by following the U. S. P. processes. A similar remark applies to commercial samples of the tinctura pruni virginianæ, B. P. C. The author, therefore, drew the conclusions that preparations of wild cherry bark do not, as a rule, represent the full value of the drug, so far as hydrocyanic acid, its supposed active constituent, is concerned, and that this might be caused by loss of acid in keeping or insufficient care in preparation.—Yearbook of Pharm., 1889, 491–495.

SAMYDEÆ.

Casearia esculenta—Constituents and Medicinal Value of the Root.—Dr. Mootooswamy, of Tanjore, India, calls attention to a drug said to be coming into use as a remedy for chronic enlargement of the liver, hepatic obstructions, piles, and diabetes. It is the root of Casearia esculenta, which, according to an analysis by D. Hooper, contains 3 per cent. of *neutral resins* soluble in ether and partly in alcohol, an *organic acid* having the character of cathartic acid, and about 10 per cent. of iron-greening tannin, the presence of which does not prevent the drug from acting as an aperient. The drug is administered according to Dr. Mootooswamy in form of decoction—2 drachms each of the drug, of cinnamon bark and of anise seed to 10 ounces of water.—Yearbook of Pharm., 1889, 513–514.

Dr. Dymock also speaks of the great repute which this drug has in Goa for the treatment of hepatic diseases and hemorrhoids.—Pharm. Jour. and Trans., Feb. 15, 1890, 660.

LEGUMINOSÆ.

Senna Pods—Value and Superiority over the Leaves.—E. F. Salmon has made comparative experiments which showed that senna pods are richer in the active constituent, cathartin, than the leaves, the latter yielding 2 and the former 2½ per cent. when suitably treated. In addition to cathartin there is found in the leaves a resinous principle and a volatile oil; these are practically absent in the pods. The pods being richer in cathartin, and not containing either resin or oil, render them especially well adapted for use as an efficient aperient, and one not too rapid in action. Cold water readily dissolves out the cathartin from the pod, which it will not do from the leaf, owing to the impervious nature of its epidermis. Accordingly for the preparation of a fluid extract, cold water will be found the best menstruum. Two macerations of the carefully picked over pods, which should also be torn in pieces, will be found to practically exhaust them. The first maceration should be for twenty-four hours ; for the second twelve is sufficient. For one pound of pods, six pints of cold distilled water for the first and about three pints for the second maceration, is a sufficient quantity to use, the liquors when strained off to be evaporated to thirteen fluidounces and the usual four ounces (25 per cent.) of spirit added, and after standing a few hours to be filtered, and, if necessary, made up to sixteen fluidounces with distilled water. The dose is one-half to two fluiddrachms, and it is perfectly tasteless and usually effectual even in the smaller quantity.—Pharm. Jour. and Trans., Oct. 12, 1889, 281.

Senna Pods.—Use in form of *Liquid Extract*, which see under "Pharmacy."

Gums — Description of Different Sorts.—Thomas Maben describes twenty-one samples of gum, embracing the following sorts: (1) Picked Khordofan; (2) Geddah; (3) Senegal; (4) Galam Senegal; (5) White Barbary; (6) Barbary Amrad; (7) Brown Barbary; (8) East India "glassy" amrad; (9) E. I. pale amrad; (10) E. I. fine amrad; (11) E. I. amrad; (12) E. I. red amrad; (13) Glassy hard brown Cape; (14) Soft Cape; (15) Fine picked white Cape; (16) Australian or Wattle Gum; (17) Brazilian; (18) Para; (19) Gum angico; (20) Ghatti; (21) Oomra. In regard to the behavior of these gums with the various reagents, the author makes the following general remarks:—The reagents employed consisted of borax, basic lead acetate, ferric chloride, silicate of potash, oxalate of ammonium and alcohol. In the case of borax the powder made into a paste with a few drops of water was employed. In all the others the reagent was in the form of a solution. All the samples gave precipitates with alcohol and also with ammonium oxalate, although with the latter the Brazilian and Australian gums gave only faint reactions. All qualitative methods for testing mucilage are unsatisfactory, and any process chosen is probably only the least of several evils. After trying several methods he found the following, though not without its faults, as good as any for comparative purposes. Two or three drops of mucilage are placed on a glass or porcelain slab, and one or two drops of the reagent added; these are then stirred together with a glass rod and the results compared. In the case of borax, acacia mucilage at once agglutinates or hardens into a gummy mass, similarly with basic lead acetate and ferric chloride, whilst it gelatinizes or forms a softer mass with potassic silicate. Similar reactions are given by the Senegal gums, the Indian amrad gums, white Barbary, white and brown Cape, and Geddah gum. Barbary brown and amrad give only a jelly with borax, otherwise they react as acacia. Australian gum agglutinates with borax, but only gelatinizes with basic lead acetate, and has no reaction with ferric chloride and potassic silicate. Brazilian gum has no reaction with potassic silicate, but gelatinizes with borax and ferric chloride and slightly with basic lead acetate. Ghatti gum gelatinizes with all four reagents, but in a slight degree only with potassic silicate. Oomra gum reacts similarly to acacia, except that it is entirely unaffected by basic lead acetate, and forms a softer jelly with ferric chloride. There are, of course, shades of difference in the various reactions which cannot be indicated by these terms, but generally speaking a fair idea is given of the nature of the gum.—Pharm. Jour. and Trans., March 1, 1890, 717–721.

Gum Ghatti—Characters and Availability for Making Mucilage.—Claude F. Henry has contributed a paper on ghatti gum. He describes the taste of the mucilage (1–3) as bland and mucilaginous and not at all unpleasant. Only 75 per cent. of the gum dissolved in water, the remaining 25 per cent. being insoluble also in hot water, even after prolonged boiling. It, however, swelled up considerably. A 1 to 3 mucilage was found to be of greater density than B. P. Mucilago acaciæ. The gum when incinerated left 1.7 per cent. of ash, which was of a whiter hue than that of gum acacia, and contained both calcium and potassium salts. The ash of gum ghatti and acacia also differed in the amount of carbonate, that of ghatti containing much the larger proportion.—Pharm. Jour. and Trans., March 22, 1890, 781.

White Mogador Gum—Probable Source.—The curator of the Museum of the Pharmaceutical Society of Great Britain, describing a recent donation of White Mogador gum, which he found completely soluble in water, whilst some commercial samples, similar in appearance, formed a glairy mucilage, remarks that in his opinion this gum is not produced in Morocco, but that it seems probable that it comes from East Africa, and that since the late troubles in the Soudan the gum has found a fresh outlet at Mogador.—Pharm. Jour. and Trans., March 15, 1890, 749.

Persian Gum—Source, Characters, etc.—Prof. E. Sickenberger states that quantities of Persian gum are sent from Bushire either to a small port on the west coast of the Red Sea or to Jedda, in order that it may be substituted for Khordofan gum. It is thence conveyed to Assouan and packed in old Khordofan packages and sold as genuine gum. Owing to its pale color and the absence of any suspicion that the gum from Assouan could be other than good gum arabic, a considerable amount has been sold. The gum, however, is described as not soluble in water, but only swelling up in it, and as being less brittle than Khordofan gum. Professor Sickenberger suggests that this Persian gum may be the produce of *Prunus Bok-*

harensis, Royle, and *Prunus Puddum*, Roxb. The specimens of Persian gum that have appeared in the London market resemble East Indian or Senegal gum of good color, rather than the white minutely cracked opaque Khordofan gum.—Pharm. Jour. and Trans., March 29, 1890, 793.

Wattle Gum—Non-Suitability as a Substitute for Gum Arabic.—J. H. Maiden communicates an elaborate paper on the subject of wattle gum, in which the subject is very exhaustively treated both from the botanical and chemical standpoint. A large number of Australian species of acacia are enumerated and their gummy products described, but cannot be nearer referred to here. His conclusions are that Europe and America must not look to Australia for any quantity of high-class gum.—Pharm. Jour. and Trans., April 26 and May 31, 1890, 869–871 and 980–982.

Tragacanth—Composition.—The suggestion of Prof. J. M. Maisch (see Proceedings 1889, 657), that some uncertainty exists as to the composition of tragacanth, as well as the conflicting statements in the various works on materia medica, has induced John Ogle to carry out an examination of tragacanth with the object of determining the amount of moisture and soluble gum present; to what extent the soluble portion resembles gum acacia, and the percentage of ash yielded. His results are tabulated as follows:

Moisture	18.92
Soluble gum	35.94
Ash	2.75
Insoluble gum (by difference)	42.39
	100.00

No evidence of the presence of starch could be obtained, the iodine test producing no coloration, nor could the official statement that "after maceration in cold water the fluid portion is not precipitated by the addition of rectified spirit" be verified. In fact alcohol at once gave an evident precipitate.—Pharm. Jour. and Trans., July 6, 3–4.

Acacine—A Commercial Substitute for Gum Arabic.—Granville G. Allen has made some experiments with "acacine," a white powder, looking and tasting like acacia, but not so bulky, and finds it unsuitable for emulsionizing oils, for which it appears to be recommended.—West. Drugg., Aug. 1889, 278; from Proc. Indiana Pharm. Assoc., 1889.

Abrus precatorius—Poisonous Action of the Albumose from the Seed.—In a previous communication (see Proceedings 1888, 393) Dr. Sidney Martin demonstrated the presence of two proteids in jequirity seeds—a globulin and an albumose—and also discussed the physiological action of the globulin. His present paper deals with the physiological action of the albumose, and he summarizes his observations as follows: The toxic principle of the jequirity resides in two proteids present in the seeds—a para-globulin and an albumose, which practically possess the same toxic properties. The activity of both these proteids is destroyed by moist heat. The snake-venom resembles abrus-poison in chemical composition, in its power of producing local lesions, of reducing body temperature and rendering the blood fluid after death, and to some extent in the effect on it of moist heat. Abrus-poison, however, is much less active than snake-venom. The fatal dose of snake-venom varies according to the species of snake from 0.0021 gm. to 0.000079 gm. per kilo. of body weight, whilst abrus-poison stands at globulin 0.01 gm., albumose 0.06 gm. per kilo. of bodily weight.—Amer. Jour. Pharm., Dec. 1889, 625–626; from Med. Chron., Nov. 1889.

Algarobia glandulosa — Uses of the Various Parts of the Plant.—James Clavin observes that of the many various trees and shrubs which go to make up our Southwestern sylva, there is none perhaps which deserves more, and few which have received less, notice at the botanist's hands than the *Mezquite* of Texas and adjacent country. From personal observation and from information procured from various sources he is enabled to refer to uses of the plant which are not generally known. The leaflets have been used with great success in the treatment of inflamed eyes. They are also applied to inflamed surfaces in the shape of a poultice, and as such have their virtues. In the form of a hot infusion they are administered as a febrifuge in certain mild forms of fever. The leaflets are of an emerald green color, a peculiar odor and a bitter, somewhat mucilaginous taste. The legumes possess properties which render them valuable. Whether they have any medicinal properties beyond that of a simple laxative is extremely doubtful, but they are economically of some considerable value. They are a first-class feed for cattle when ripe, and a plentiful crop of them is always produced, no matter how dry and unpropitious be the season for products of tilled soil. They are rich in grape sugar and other nutritive principles, and are easy of digestion. When unripe, though, they are apt to produce in horses and cattle the disease known as scours, a species of dysentery. A pleasant beverage, called by the Mexicans "atole," is made from them; it is simply an infusion made by throwing the crushed ripe beans into boiling water, or by boiling them together, and afterwards straining. A fermented liquor, used to some extent in Mexico, is prepared in that country; the fruit easily undergoes alcoholic fermentation. Owing to the fact that the legumes are indehiscent and after falling to the ground are soon destroyed by insects, it is seen that the growth of the mezquite is not as dense or as easy of attainment as it would otherwise seem. The fact that these legumes are a favorite food of cattle, and that their seeds always remain undigested and are passed in such a state in the fæces of cows and horses, will perhaps best explain the rapid extension of this hardy shrub or tree.

The wood, at the present time, is the most important product of the mezquite, for the reason that it furnishes in those regions where it is indigenous the great bulk of the fuel used; and because of its value as a timber which will stand the ravages of time. While a hard, fine-grained and easily polished wood, the fact that the centre of the trunk is often fissured detracts considerably from its value in cabinet work. The most valuable quality is the bold front it opposes to decay, and striking proof of this is not wanting, for in the old missions and in numerous old Spanish houses these mezquite beams still support the stone roofs, though a century has passed since they were first set in place. The reddish-brown heart-wood, which is surrounded by a superficial layer of canary-yellow sap-wood, contains tannin resembling nut-gall tannin in the blue-black ferric reaction. The decoction of heart-wood chips is used in diarrhœa, and is a very valuable remedy in it and similar complaints. The heart-wood of the roots —which are notable for the immensity of their growth, spreading to great distances and reaching into the earth to a depth of as much as 60 feet— also contains much tannin (6 to 7 per cent.), whilst the white-wood and bark of the root contains comparatively little (0.50 per cent.). The gummy exudation (mezquite gum) is well known, and has been previously described in these "Proceedings" (1886, 456).—Amer. Jour. Pharm., Feb. 1890, 65–69.

Logwood—Increase of Color by the Agency of Chlorine.—In a paper presented to the Franklin Institute, W. W. Macfarlane and Philip S. Clarkson call attention to the action of chlorine upon logwood and hæmatoxylin. Dyers know that a decoction of logwood made in contact with the air is much stronger than one made by boiling the wood under pressure in a closed vessel. It is also known that processes have existed for the past forty years for increasing the strength of logwood decoctions by means of oxidizing agents. For instance, there is an old patent in which the use of chlorates, nitrates, and the like for this purpose was protected. The authors, in some preliminary experiments, found that chlorine water had the same effect, and on critical trial they discovered that when chlorine was added in the proportion of four atoms to one of hæmatoxylin, the dyeing strength was increased by 150 per cent. There seems to be little doubt that this is simply owing to the formation of hæmatein.

Balsam of Peru—Artificial Preparation.—Balsam of Peru is so frequently adulterated that the feasibility of making a chemically pure substitute, by combining only its active constituents, is seriously considered. The drug contains upward of 60 per cent. of cinnamein, that is to say, of the benzylic ethers of cinnamic acid C_7H_7, $C_9H_7O_2$, and of benzoic acid C_7H_7,$C_7H_5O_2$; 10 per cent. (about) of free cinnamic acid, and a small quantity of free benzoic acid. Binz supposes that a mixture of the ethers with these free acids, in the same proportions as they exist in the balsam of Peru, would have the same effect as the latter upon the organism.—Amer. Jour. Pharm., April 1890, 180; from Le Monde Phar., Feb. 20, 1890.

Robinia Pseudacacia, Lin.—Examination of the Bark.—The bark of the locust tree has been examined by Prof. F. B. Power and Jacob Cambier, with a view of determining the principle to which its reputed poisonous properties are due. About 2 per cent. of fat and resin was obtained; also some cane-sugar, coloring matter, gum, a little tannin, and probably asparagin. The presence of considerable starch was demonstrated by the micro-chemical test; but a decoction of the bark, after cooling, is merely colored brown; the principle preventing the appearance of the blue color has not been determined. The bark contains a small amount of an alkaloid, which was shown to be identical with *choline.* Neurine was not present, and when a kilogram of the bark had been allowed to undergo fermentation, a sufficient amount of basic substances could not be obtained to determine their character. The authors then turned their attention to the albuminoid substances, and succeeded in isolating a globulin and an albumose, of which the latter produced purging and vomiting. This *phytalbumose* is tasteless, soluble in water, and coagulated and rendered inert by heat. It is precipitated by potassium-bismuth iodide and by tannin, and from its acidulated solutions by potassium ferrocyanide.—Amer. Jour. Pharm., April 1890, 178–179; from Pharm. Rundschau, Feb. 1890.

Panbotano Bark—A Substitute for Quinine.—Prof. Dujardin-Beaumetz calls attention to some observations made by Valude respecting "panbotano" a new specific for the fever and other symptoms of paludism. This medicament consists of the bark of the panbotano, which is a leguminous tree of Mexico, isolated plants being cultivated in some parts of Europe. Villejean has studied the bark and found fatty matters, tannin, etc., but no alkaloid or glucoside. Valude administered panbotano bark to his patients in form of an alcoholic tincture, and also gave a preparation made by maceration. He preferred the latter, which he made by putting 70 gm. of bruised bark into a quart of water and boiling down to a pint, this being the quantity to be taken in twenty-four hours. In the eight paludic cases described by Valude, a single dose, or, at most, two doses, caused the disappearance of well-defined tertian fevers.—Amer. Jour. Pharm., April 1890, 182; from Nouveaux Rem., March 8.

Psoraleæ—Useful Species.—Professor J. M. Maisch calls attention to a number of useful plants belonging to the genus "Psoralea." In addition to *Psoralea castorea*, Watson, growing from Arizona to Nevada, and *Ps. mephitica*, which abounds in Southern Utah, which were described by Dr. Edward Palmer in 1878 (see Proceedings 1879, 245), a more widely known species has found useful application, viz.,

Psoralea esculenta, Pursh, which abounds in that portion of the United States extending westward from the lakes to the Rocky mountains, and from the Saskatchawan river downward to Louisiana and Texas. An excellent botanical description of the plant and of its tuberous root, and the uses to which it is applied as food, etc., by the Indians, is given by Dr.

V. Havard, Surgeon U. S. Army at Fort Lincoln, Dakota, and is reproduced in the present paper. The plant is the *pomme de prairie* or *pomme blanche* of the early Canadian voyageurs; the *prairie turnip* or *prairie potato* of the American settlers; the *tipsinah* of the Sioux, and the *taahgu* of the Osage Indians. Dr. Havard had sent some of the root to Mr. Clifford Richardson for analysis, which was completed last year, but is now published for the first time; Mr. Richardson's results being as follows:

Water	9.49
Ash	1.74
Oil (with petroleum ether)	.37
Resinous substances (with ether)	.35
Sugar (with 80 per cent. alcohol)	4.77
Sweet substance (soluble in water)	1.14
Starch (by difference)	69.60
Globulin	1.04
Albumin soluble in water	1.02
Albumin insoluble in water	6.10
Non-albuminoid nitrogenous matter	.90
Fibre	3.48
	100.00

Mr. Richardson remarks that the roots are distinguished by their large amount of starch, by the presence of a new sugar readily crystallizing, and by the varied forms of nitrogenous matter; he will further investigate the sugar isolated by him.

So far as Prof. Maisch has been able to ascertain, the three species above mentioned are the only ones used as food. Of the species employed medicinally,

Psoralea glandulosa, L., attained some notoriety and created some confusion during the first half of the present century through an error into which the distinguished French naturalist, Alcide Dessalines d' Orbigny was led more than sixty years ago, while traveling in South America, by referring to this plant the Paraguay tea, or *yerva maté*, which is extensively employed in South America. The leaves of this plant were exhibited at the Centennial Exposition in Philadelphia under the vernacular name of *culen*. The odor can hardly be called agreeable; it resembles that of rue, and the leaves are, in their native country, employed as a tonic and anthelmintic, and externally as a vulnerary. The root possesses emetic properties. Both the leaves and root have been admitted into the Mexican pharmacopœia under the name of *yolochiahitl*. An analysis of either part does not appear to have been made.

Psoralea bituminosa, L., a European species, and *Ps. physodes*, Douglas, a Californian species, are both characterized by trifoliate leaves, as is *Ps. glandulosa*. The leaves of the first mentioned have long been popularly employed as a tonic, stimulant and emmenagogue. Another species, *Psoralea melilotoides*, Michaux (s. *Ps. Melilotus*, Persoon), growing from Virginia southward, and westward to Illinois, has recently been the subject of essays by Aug. Bradley and by Edward D. MacNair. The plant is very common in upper Carolina and Georgia, and appears to have medicinal virtues, being described by Dr. Carter as aromatic, bitter tonic, and nervine, and used in chronic strumous diarrhœa, the root being the principal part employed. This is perennial and fusiform, sending out stout branches of similar shape, ½ to 1 inch thick, from 8 to 12 inches and more in length, externally light-brown, internally white, and tough and fibrous in the bark as well as in the meditullium. In the fresh state it has an agreeable aromatic odor, and a bitterish spicy, or even rather acrid taste; but odor and taste are much weaker after drying. Mr. MacNair obtained from the fresh root about 2 per cent. of volatile oil, having the specific gravity 0.93, a pungent and bitterish taste and a neutral reaction. Tannin appears to be absent; but a dark-green color is produced in the infusion and tincture by ferric chloride. Starch is present; also a bitter principle which has not been isolated. Mr. MacNair has made a number of galenical preparations from the root, among them a *compound tincture*, made like compound tincture of gentian, an *extract*, and a *fluid extract*, both of them made with diluted alcohol, the latter containing when finished also 5 per cent. of glycerin. A 20 per cent. *tincture*, made with diluted alcohol, is given, according to Mr. Bradley, in doses of one to four fluiddrachms. Some of the popular names of the drug are Samson's snake-root, congo root, pigtail root, and Bob's root. A Mexican species,

Psoralea pentaphylla, L., having five leaflets, yields the root which is mentioned in the universal pharmacopœias of Jourdan and of Geiger as *radix contrayervæ novæ, p. albæ (s. majoris, s. mexicanæ)*; it had been recommended as a substitute for the South American contrayerva (*Dorstenia*), but like the latter had become obsolete. Though of Mexican origin, it appears to be at present little known in that country, and is not mentioned in the Mexican Pharmacopœias of 1874 and 1884. The root was described as being of the thickness of a finger to about two inches, with a rugose brown bark, which is internally white and covers a white woody axis; taste aromatic and sweet. Recently the drug was chemically examined by Mariano Lozano y Castro, who obtained the following results: Moisture, 10.0; ash, 3.75; extracted by petroleum ether (fat, 1.38; resin and volatile oil, 0.12), 1.50; ether extract (crystalline acid, 0.40; fat, 0.50; resin and color, 2.40), 3.30; alcohol extract (alkaloid and glucose, 9.25; resin, 1.46), 10.71; water extract, gum and sugar, 8.336; starch, 26.5; albuminoids, 1.0; cellulose and lignin, 28.75 per cent. The presence of an alkaloid was inferred by Mr. Lozano from certain experiments and results obtained, but this is probably an error, the product of this experiment being evidently chloride of calcium mixed with organic matter of unknown quantity and quality. Finally, the seeds of

Psoralea corylifolia, Roxburgh, an annual plant with undivided leaves, have been long used in India as a tonic and deobstruent, and in skin diseases. Dr. Dymock called attention to the uses made in India with the expressed oil and oleo resin of the seeds (see Proceedings 1877, 209, and 1882, 245) ; but there appears to be no record of experiments made with them in Europe.—Amer. Jour. Pharm., July 1889, 345–352.

Loco Plants—Varieties Observed in Montana.—In a paper communicated to " Botanical Gazette," F. W. Anderson observes that when horses, cattle or sheep in Montana, die from unknown causes, which have produced more or less marked cerebral disturbance within a few days or hours before dissolution, accompanied by one or more minor symptoms, they are said to have been " locoed," that is, poisoned by some usually mysterious unknown plant. The author gives a full description of the symptoms, which vary so considerably that it seems unlikely that one poison causes them all. Four common plants are said to " loco" stock in Montana, viz.: *Oxytropis Lamberti*, *Leucocrinum montanum*, *Fritillaria pudica* and *Zygadenus elegans*. The first is now known to produce no evil effects except when eaten in large quantities for days together. *Leucocrinum montanum* is said to be very fatal to sheep after the fruit has developed. It grows close in the grass, and its narrow grass-like leaves are not easily avoided by stock. *Fritillaria pudica* is almost the first plant to flower in spring. Before the grass is green horses and sheep often nip off the leaves. The scaly bulb is somewhat acrid to the taste. *Zygadenus elegans* does not flower so early, but sends up its long grassy leaves at the same time. Sheep eat much of this plant, even nipping off the panicles when they appear. The whole plant is acrid, but the deep-set bulb is strongly so. F. D. Kelsey, writing from Montana to the same journal (Botanical Gazette, 1889, 20), states that he had recently received specimens of a root and plant from a ranchman, with the declaration that " it was a ' loco' weed and that it was killing horses." The specimen proved to be *Oxytropis lagopus*, Nutt.—Amer. Jour. Pharm., Aug. 1889, 408–410.

SIMARUBACEÆ.

Quassia amara and Picræna excelsa—Comparative Examination of their Bitter Principles.—It being usually assumed that the bitter principles of the woods of *Quassia amara* and *Picræna excelsa* are identical, Massute has made a comparative examination of the two. By shaking an alcoholic extract of quassia wood with chloroform a mixture of crystals was obtained, from which eventually four bitter principles, differing in melting point and solubility, were separated. One of these melting at 210°–211° and another melting at 239°–242° were in too small quantity to be further examined, but the former agreed in melting point and crystalline form with the quassiin of Wiggers ($C_{32}H_{40}O_{10}$). Of the other two, one melted at 215°–217° and is represented by the formula $C_{35}H_{16}O_{10}$, while the other melted at 221°–226° and is represented by $C_{37}H_{50}O_{10}$. From the wood of *Picræna excelsa* two crystalline compounds were separated, both having lower melting points than either of the quassia compounds. One was in needles, melted at 204°, and had the composition $C_{35}H_{46}O_{10}$, whilst the other was in prisms, melted at 209°–212° and had the composition $C_{36}H_{48}O_{10}$. It appears, therefore, that all these compounds are homologous but each wood presents a different series. A crystalline body that was obtained in minute quantity from *Quassia* wood, but appeared to be more plentiful in the bark of *Picræna* wood, dissolved in acidulated alcohol with a beautiful ultramarine blue fluorescence; it was less bitter than quassiin or picrasmin and gave the reactions of an alkaloid.—Pharm. Jour. and Trans., May 3, 1890, 891; from Arch. d. Pharm., March 1890, 147.

Picrasma quassioides, Benn.—Constituents of the Wood.—W. Dymock and C. H. Warden communicate the results of a chemical examination of the wood of *Picrasma quassioides*, Benn., a small tree indigenous to the subtropical Himalaya and China. The bark has a reputation as a febrifuge. The wood consists of pieces of the larger branches from three to six inches in diameter; it is covered with a dark brown bark, which has a somewhat netted surface, and is marked by transverse scars. On rubbing off the outer layer of suber an olive-gree surface is exposed. The bark from a stem of 3 inches in diameter was ⅛ inch thick and very compact. The wood and bark are of a light yellow color; in the former a transverse section shows numerous fine, close medullary rays which intersect well-marked regular rings. The centre of the stem is occupied by a cylinder of pith. In short, in appearance and taste the drug bears a close resemblance to *quassia*. The results of the authors' experiments, which are given in some detail, indicate that the wood contains a crystallizable principle, probably quassiin, a fluorescing bitter resin-like principle, and at least one other non-crystallizable, bitter, resinous body, probably the uncrystallizable quassiin of Adrin and Morceaux.

The authors also record some experiments made to ascertain whether any of the *jaborandi alkaloids* were present in the wood. They obtained indications of the presence of a distinctly alkaloidal principle, but no evidence that it is related to the jaborandi alkaloids.—Pharm. Jour. and Trans., July 20, 1889, 41–43.

JUGLANDACEÆ.

Hickoria olivæformis, Rafinesque—Culture, Variety, etc.— Prof. Chas. Mohr communicates some interesting facts and observations respecting the pecan tree. This handsome tree is distributed over a large extent of territory, being found frequently in the bottom lands of the Mississippi valley, as far north as southern Iowa, and on the Ohio as far as southern Indiana, along the Missouri to southeastern Kansas, through the Indian Territory southwestward through Texas and New Mexico. In its favorite localities, in the rich and more elevated portions of river bottoms, where it is assured throughout the year of abundant moisture, and where at the same time there is no danger of prolonged submersion by inundations, the pecan tree constitutes the preponderance of the forest growth, and attains its greatest perfection. The author describes the botanical characters of the plant, the description being accompanied by illustrations showing the leaf, inflorescence and fruit. The latter is of two kinds, that growing in the more northern sections being smaller and having a harder shell, whilst the southern pecan is larger and has a very thin so-called paper shell, the best fruit being that from cultivated trees. The author, furthermore, gives his experience in the cultivation of the tree, which seems to be easily accomplished and profitable.—Pharm. Rundschau, March 1890, 56–59.

PIPERACEÆ.

Pepper—Cultivation in Sarawak (Borneo) and in Siam.—According to "British Consular Reports," great progress has of late years been made in the cultivation of pepper in Sarawak. The pepper gardens are owned by Chinese. Two crops are procured in the year. In one plantation visited there were 7,000 vines, and each plant is valued at $3. The services of twenty coolies were required to work this garden. As a proof of the extent to which pepper cultivation is being carried out, it was estimated that the total export of pepper from Sarawak for 1889 would amount nearly to 1,000 tons. On the other hand, although Siam pepper is considered the most valuable variety of any, and in spite of the fact that of recent years its price has risen considerably, the cultivation is decreasing rather than increasing. Most of the Siam pepper grows in the province of Cambogia.—Chem. and Drugg., May 3, 1890, 606.

Black Pepper—Novel Adulterant.—Dr. H. Weller draws attention to a novel adulterant of whole black pepper, which is not easily detected on sight, viz., an ore of iron (by analysis found to agree with the so-called bean-ore). It is used in small globular pieces which only after close inspection are seen to be of a somewhat lighter color than the pepper. The weight of the adulterant requires the addition of only a small bulk to make considerable gain.—Chemiker Ztg., 1889, 1030.

RHAMNACEÆ.

Cascara—Commercial Quality.—Dr. E. R. Squibb discusses the character of the bark of *Rhamnus Purshiana* as it occurred in the market in the early summer of 1889, and describes it as generally unsatisfactory, which probably is due to collection at the improper seasons as well as to bad methods of collection. He maintains that buckthorn bark—*Rhamnus Frangula*—is not only superior to cascara bark, but that the supply is always abundant and of uniform good quality.—Ephemeris, July 1889, 1243–1244.

CELASTRACEÆ.

Euonymus atropurpureus — Analysis of the Root-Bark.—W. A. H. Naylor and E. M. Chaplin have separated from wahoo bark a crystallizable glucoside, for which they propose the name

Atropurpurin.—This principle they obtained instead of asparagin, noticed by Wenzell, whose "euonymin" they, however, obtained also, together with citric, tartaric and malic acids, neutral fixed oil, crystalline free fatty acids, an acrid principle, yellow and brown resin, bitter extractive and wax. Their results differ from Wenzell's chiefiy in that instead of asparagin they obtained atropurpurin, which contains no nitrogen ; besides which they got bitter extract instead of a soft resin, free fatty acid in place of crystalline resin, brown resin soluble instead of insoluble in ether, and an acrid pungent principle that Wenzell failed to detect.—Yearbook of Pharm., 1889, 405–411.

Since communicating their above paper, the authors have further investigated the crystalline substance which they had provisionally named "atropurpurin." They deemed it advisable to prepare it in larger quantities, and were able to obtain it in greater condition of purity. The pure substance, when re-examined, failed to reduce Fehling's solution, and, though having in all other respects the properties previously described, proved to be

Dulcite, or a body isomer with it. The authors have also examined a few specimens of

Euonymin, and they are interesting as showing the kind of proximate principles upon which manufacturers rely for producing the reputed effects of the drug. To their knowledge these specimens may be regarded as fairly representative of the different makes supplied by wholesale druggists.

	(1)	(2)	(3)	(4)	(5)
Moisture, per cent.	4.10	4.70	4.90	8.10	This sample was entirely soluble in cold water, and consisted of the aqueous extract of the bark diluted with powdered liquorice.
Organic matter, per cent. . . .	59.53	72.70	71.46	78.85	
Ash soluble in water, per cent. .	2.21	12.50	2.72	6.20	
Ash insoluble in water, per cent.	34.17	10.10	20.92	6.85	
Silica, per cent.	7.12	3.20	3.43	1.57	
Portion extracted with—					
(1) Cold water, per cent. . . .	25.20	55.60	14.18	56.26	
The marc then treated with—					
(2) Proof spirit, per cent. . . .	10.58	2.48	12.25	2.60	
And finally with—					
(3) Rectified spirit, per cent. . .	8.49	3.58	14.74	1.03	

No. 1. The insoluble matter consisted mainly of carbonate of barium. The proof spirit extract was chiefly composed of yellow resin and was slightly bitter to the taste. The rectified spirit residue consisted of fair proportions of brown resin and free fatty acids, and was markedly acrid. Both extracts were of a green color.

No. 2. The insoluble matter was chiefly alumina. The product obtained by treatment with proof spirit consisted chiefly of yellow resin, and was distinctly bitter. That obtained by rectified spirit colored bright green, was oily and markedly acrid and contained a small proportion of brown resin.

No. 3. The insoluble matter was mainly composed of carbonate of barium, together with salts of lime. The proof spirit extract was of a dull green color, friable and faintly bitter, and contained yellow resin. Rectified spirit yielded a bright green oily extract, free from acridity and containing a good proportion of brown resin.

No. 4. The insoluble portion consisted of salts of iron, alumina and lime. The proof spirit extract was composed chiefly of yellow resin, which was colored bright green, having an extremely bitter taste. The rectified spirit extract contained free fatty acids and was devoid of bitterness, but faintly acrid.

The authors, furthermore, have determined the most suitable menstruum for a *Liquid Extract of Wahoo*, which see under "Pharmacy."—Pharm. Jour. and Trans., Dec. 14, 1889, 472–474.

AQUIFOLIACEÆ.

Prinos verticillatus—Proximate Examination of the Bark.—S. Stewart Smith has extracted the bark of *Prinos verticillatus* with the following results:

Extract with	Per cent.
Petroleum ether	2.44
Stronger ether	2.07
Absolute alcohol	6.63
Water (including 0.23 per cent. ash.)	5.36
Caustic soda (after deducting 1.19 per cent. ash.)	3.99
Diluted acid (after deducting 2.05 per cent. ash.)	1.79
Chlorine water	1.96
Soluble organic compounds, total	24.24

The petroleum extract contained a little volatile oil. The ether extract was entirely soluble in hot alcohol, had a neutral reaction, and was free from tannin. The alcohol extract was entirely soluble in chloroform, partly soluble in water with a faint acid reaction, contained tannin, reduced Fehling's solution, and gave with Mayer's reagent a slight precipitate, the nature of which was not ascertained. The powdered bark contained 9 per cent. of moisture and yielded 4.3 per cent. of ash.—Amer. Jour. Pharm., June 1890, 275.

EUPHORBIACEÆ.

Euphorbia Lathyris—Proximate Components of the Seeds.—R. Tawara has reported to the Chemical Society of Tokio the results of a chemical investigation of the Chinese drug "ookusuischi"—this being the seeds of *Euphorbia Lathyris.* He found besides the oil noticed by O. Zander, two crystalline principles, one of which proved to be identical with æsculetin. The second body, which is present in the seeds to the amount of 0.024 per cent. only, was not further examined. Æsculin does not seem to be present.—Chem. Zeitg., 1889, 1706.

Manihot utilissima — Uses in Guatemala.—William T. Brigham describes the preparation of cassava bread from the roots of the "arrow-root plant" in Guatemala, as follows: The tuberous roots of the manioc (*Manihot utilissima*) often attain a weight of twenty or thirty pounds, and are full of a poisonous juice, deadly when swallowed. A mahogany board is proided, into which broken crystals of quartz are inserted, and this serves to grate the root into a coarse meal, which is washed carefully (the starch is partly removed, and settles in the water as tapioca), and is then placed in a long sack of basket-work, called very appropriately *serpiente.* This ingenious press is fastened at one end to a house beam, while on a lever placed through the loop at the other end all the children of the family sit in turn, or together if they are small; and the squeezed mass is dexterously made afterwards into flat loaves, about three feet in diameter, and not more than a quarter of an inch thick, dried, and then baked. The result is a wholesome and very nutritious bread, which keeps a long time and is capital on an excursion.—Amer. Drugg., Nov. 1889, 212.

Ricinus communis—Production of Oil in Hungary.—It is stated in "Chem. and Drug." (April 19, 1890, 526) that a season or so ago it was pointed out that some parts of Hungary would be particularly suitable for the cultivation of the castor-oil plant. The hint was taken by the local landowners, and there are now over two hundred cultivators who have made experiments with the plant. The coming autumn will, therefore, show whether Hungary is likely to be able to compete with British India as a castor-oil producing country; the experiments made hitherto have yielded excellent results, inasmuch as one culture yielded 60 per cent. of oil and 40 per cent. of residue for oil-cakes.

Croton Seeds—Extraction and Percentage of Fixed Oil.—Wm. C. Zinnel has determined the amount of oil present in commercial croton seeds. The seeds were beaten to a paste, exhausted by successive portions of the solvent, and the latter then evaporated or distilled. Using for each experiment 100 gm. of seed, the amount of oil obtained was as follows: with benzin, 33.321 gm.; with chloroform, 22.9 gm., and with carbon disulphide, 33.7 gm. The last two oils were darker in color and more viscous than the first; that obtained by benzin was pale straw-yellow and had the specific gravity .943. The cause of the small yield with chloroform was not ascertained. The seeds (100 gm.), deprived of the testa, which constituted 29.67 per cent. of the entire weight, gave with benzin 21.8 gm. of oil; no cause is assigned for the deficiency as compared with previous experiments. The testa yielded 1.65 per cent. of oil.—Amer. Jour. Pharm., March 1890, 122.

Croton oil—Experiments with Oils Prepared in Different Ways.—Reuter communicates the results of experiments made with croton oils prepared in different ways: (1) Croton oil extracted direct from the seeds by means of alcohol, which was a very thick brownish-yellow liquid, soluble in light petroleum spirit and very freely in ether and in alcohol; it had a very acrid taste and consisted principally of free crotonoleic acid. (2) Oil removed by light petroleum spirit from seeds already extracted by alcohol, which was less acrid, contained only a trace of free crotonoleic acid, and consisted principally of the neutral glyceride. It dissolved with difficulty in absolute alcohol, but freely in ether and in light petroleum spirit. 5 c.c. shaken with 45 c.c. of alcohol and allowed to stand showed an oily layer measuring 2.5 c.c., so that the remaining 2.5 c.c. had dissolved in the alcohol in the proportion of 1 in 18. Upon adding 6 drops of oil No. 1 (free crotonoleic acid) the oil layer decreased to 1.8 c.c., and with 12 drops to 1.3 c.c., showing that, as recently suggested (Phar. Jour. and Trans. p. 978), the solubility of croton glyceride in alcohol increases with the proportion of free crotonoleic acid accompanying it. This oil added drop by drop to 25 c.c. and shaken after each addition did not cause permanent turbidity until 24 drops had been added. (3) Oil extracted direct by means of light petroleum spirit from seeds not previously treated with alcohol had an acrid taste and contained, besides the neutral glyceride, some free acid, so that it might be described as an acid oil. Of this oil 31 drops could be added to 25 c.c. of alcohol before permanent turbidity was produced. (4) Oil extracted direct from the seeds by means of ether contained both neutral glyceride and free acid, the latter being present in rather larger proportion than in oil No. 3, as it is more soluble in ether than in petroleum spirit. This was shown by the addition of 37 drops to 25 c.c. of alcohol before a faint turbidity became apparent. (5) Croton oil of commerce; deep yellow; probably pressed from seeds. Added drop by drop to 25 c.c. of alcohol, turbidity was produced by 32 drops. In this and the previous cases the turbidity disappeared upon the addition of a drop or two of oil No. 1. The author points out that as the methods of preparing croton oil differ, the proportions of the free acid and neutral glyceride in commercial oil may vary widely.

Some manufacturers are said to have given up pressure as a means of obtaining the oil in favor of extraction with light petroleum spirit, which as shown by oil No. 3 would give an acid oil, whilst the proportion of free acid liable to be extracted would increase with the age of the seeds through the breaking up of the glyceride. He also points out that Hirschheydt has proved that a neutral oil, though free from some disadvantages attending the administration of an acid oil, is sufficiently active, since the neutral glyceride is split up in the human organism by the pancreatic ferment. —Pharm. Jour. and Trans., June 28, 1890, 1060; from Pharm. Ztg., June 14, 1890, 320.

Croton Oil—Constituents.—Referring to H. Senier's and E. v. Hirschheydt's papers on the constituents of croton oil (see Proceedings 1878, 501, 1884, 195, and 1887, 282), Professor Kobert contributes a memoir on the same subject. From the papers of Senier it appeared that under certain conditions croton oil was separated by alcohol into two portions, the solution containing the vesicating principle, which was an acid closely allied to oleic acid, and the insoluble portion the purgative principle. An opinion was expressed by Hirschheydt that two kinds of active principles could not be so separated, since the purgative and the vesicating action alike are due to crotonoleic acid, which may occur in the oil both in the free state and as a glyceride. Professor Kobert appears still to hold this view. In the present paper the opinion is expressed that a definite relation of solubility between croton oil and alcohol cannot be established, since it varies with the age of the oil—oils occurring, in fact, which are soluble in alcohol in any proportion, an experience which so far is not necessarily opposed to that of Senier. By treatment with successive quantities of alcohol fresh quantities of oil are said to pass into solution; the portions also show different degrees of solubility, the acrid-tasting and vesication portion being the most soluble. It is thought that the varying solubility of the oil may depend upon the fact that the crotonoleic glyceride no longer exists in old samples of the oil, but only the free acid. From a large number of pharmacological experiments it was concluded that a neutral croton oil is essentially milder in its action than an acid oil such as is official in the P. G. Experiments with the free crotonoleic acid did not give favorable results, as doses less than 0.01 gram were uncertain in their action, whilst larger doses caused a very disagreeable burning sensation in the intestines. Professor Kobert, therefore, recommends, if croton oil be retained in the Pharmacopœia, that only the neutral croton glyceride should be used, which can be kept unaltered if protected from light. In conclusion, it may be remarked that no chemical examination appears to have been made by Senier of the insoluble "purgative" portion separated by him, though it would be interesting to know whether the portion of croton oil remaining undissolved by spirit under the conditions mentioned by him consisted wholly or in part of the neutral crotonoleic glyceride, which might also to some extent be carried into alcoholic solution by free acid present in the oil. and so appear as a constituent of both the soluble and the insoluble portion.—Pharm. Jour. and Trans., May 31, 1890, 978; from "Arbeiten des Pharmacol. Institut. zu Dorpat."

URTICACEÆ.

Urtica—Constituents of Different Species.—L. Reuter obtained from the powdered leaves of *Urtica urens* and *Urtica dioica*—by treatment with slaked lime and water and evaporating—a glucoside which was free from nitrogen and gave precipitates with the following reagents: Iodo-iodide of potassium, potassio-mercuric iodide, platinum chloride, mercuric chloride, palladium chloride, phospho-tungstic acid. Potassium ferricyanide is reduced, as is also potassium chromate, in presence of sulphuric acid. Tannin, sodium chloride, ammonia, sodium hydrate, sodium carbonate and bicarbonate, have no effect. The aqueous solution is neutral. From the seeds of

Urtica pilulifera, which in the Orient are highly valued as a galactopæum, the author also extracted a glucoside. The powdered seeds were treated with magnesia and water, the mixture evaporated to dryness and extracted with chloroform. He obtained an oil rich in chlorophyll. The residue from the above was extracted with absolute alcohol, the latter distilled off, and the remainder taken up with water. On acidifying this solution with hydrochloric acid, it yielded with iodo-potassium iodide a copious precipitate. Its behavior towards Fehling's solution before and after treatment with acids showed it to be a glucoside.—Amer. Jour. Pharm., Jan. 1890, 11; from Pharm. Centralh., 1889, 609.

Cannabis indica—Cause of Uncertainty of its Action.—Dr. Cripps Lawrence directs attention to the uncertainty of the action of *Cannabis indica*, which he attributes to variation in the plant. He points out the necessity of care as to dose at the onset, and if this be done he considers it a valuable sedative and hypnotic in cases of renal disease, senile chorea and paralysis agitans, menorrhagia, migraine, persistent headache and allied conditions. He expresses the hope that the important field for research in reference to the component alkaloids existing in *Cannabis indica* may be ere long opened up by analytical chemistry. This would probably be best done in India, where the active forms of the plant could be examined at regular intervals during growth.—Pharm. Jour. and Trans., May 3, 1890, 893; from Lancet, April 12, 1890, 824.

Cannabis indica—Value in Facial Neuralgia, etc.—Dr. J. Russell Reynolds draws attention to the value of *Cannabis indica* as a remedy in facial neuralgia, migraine, and some forms of epileptic attacks. He states that in some individuals a grain of the extract may produce toxic symptoms, but he has never found one-fifth of a grain do so, yet by gradual increase of the dose it may be taken up to three or even four grains. Nevertheless he prefers the tincture, since pills often become hard and insoluble, and the dose cannot be so readily and gradually increased. The uncertainty of the action of this drug, so often referred to by medical men, is probably due in some measure to the great variation in strength of the drug according to the season and the place of growth, and points to the necessity for some means of standardizing the tincture. Until, however, chemical research has indicated more clearly than at present is the case what the active principle of the drug really is, such standardization is practically impossible.—Pharm. Jour. and Trans., March 29, 1890, 792; from Lancet, March 22, 1890, 637.

Antiaris toxicaria—Active Constituents of the Milky Juice.—According to H. W. Bettink, the milky juice of *Antiaris toxicaria*, used as arrow poison in the East Indian Archipelago, contains at least three active principles, which seem to be closely allied to each other. The most important of these,

Antiarine ($C_{14}H_{20}O_{50}$), is precipitated from its solutions by tannin, but only in a state of insoluble combination with other substances. When the dried juice has been treated with petroleum ether or benzol, the resin, the fat, and the india-rubber-like portion removed, and the residue extracted by alcohol, a thick fluid remains, from which the antiarine separates in the form of crystals. These represent about 1.7 per cent. of the dry, or 0.6 per cent. of the fresh juice. According to Tichmann, they belong to the rhombic system. By addition of sulphuric acid they are colored light brown and decompose. Dogs and rabbits are killed in a few moments by a dose of one-half mgm. injected into the blood. The second constituent is obtained from the same syrupy mass or mother-liquid by drying it on a water-bath, letting it stand for twenty-three hours, and then stirring it up with small quantities of water, during which process more of the antiarine crystals will be separated. After they have ceased to form, a substance may be thrown down by diluting the mother-liquid with water and adding a solution of tannin. This substance, for which the name oubaine has been proposed, very closely resembles antiarine in its physiological effects, and gives the same reactions with acids, but differs in being very soluble in water and in its behavior towards tannin. The third constituent of the juice—also non-crystallizable, easily soluble in water and alcohol, but not precipitated by tannin—is called toxicarine. The author promises further communications upon the subject.—Amer. Drugg., March 1890, 52; from Ned. Tijdschr. v. Pharm.

CUPULIFERÆ.

Quercus alba—Characters of the Tannin, etc.—Henry Kraemer has made some interesting studies concerning the constitutional characters of the tannin of white-oak bark, from which it appears that it yields upon sublimation a crystalline principle resembling somewhat pyrocatechin. Upon atmospheric oxidation it gives the insoluble red or phlobaphene; and upon fusing some of the tannin with potassium hydrate gives a phenol similar to protocatechuic acid.

The aqueous solution of the tannin of *Quercus alba* is light yellow in color, reddens blue litmus, and gives also the following reactions:

With Fe_2Cl_6, an olive brown color possessing a slight fluorescence; in strong solutions, a dark olive brown precipitate.
With alkalies, a deep red color, having also a decided blue fluorescence.
With $Pb(C_2H_3O_2)_2$, a flocculent precipitate (hardly white).
With $K_6Fe_2(CN)_{12} + NH_3$, a deep red color.
With $AgNO_3$, on application of heat, a reduction of metallic silver.
With Fehling's solution, on application of heat, a reduction of metallic copper.
With uranium acetate, a red brown precipitate, redissolving in acetic acid.

The alkaline solutions of the tannin upon certain conditions possess a blue fluorescence. This fluorescent principle was perceptibly present in the largest amount in bark recently collected, and but sparingly in many of the older commercial barks. Whether this fluorescence is a character of the tannin or a decomposition product of it, cannot from present work be accurately stated.—Amer. Jour. Pharm., May 1890, 236–240.

CONIFERÆ.

Turpentine—Production, Test for the Oil, etc.—R. Gaillard Dunwody communicates an interesting paper on the methods of collecting turpentine and the distillation of

Oil of Turpentine.—Respecting the latter, he observes that in recent years it has been thought that the commercial oil is much adulterated with petroleum, and he has accordingly examined a number of commercial samples from various sources and compared them with samples of known purity, without, however, reaching any conclusive results, since the usual tests fail to reveal the presence of even high percentages of petroleum. He found, however, that a mixture of 99 c.c. absolute glacial acetic acid with 1 c.c. of water when mixed with turpentine oil in the proportion of one to one, formed a clear mixture, but with petroleum in the same proportions it would not mix. Mixtures of petroleum and turpentine oil in different proportions were found to require different amounts of the above acid for making a clear solution, as follows:

Petroleum	1	2	3	4	5	7	8 c.c.
Turpentine oil	9	8	7	6	5	3	2 c.c.
Glacial acid	40	60	80	110	150	230	270 c.c.

The author does not mention that he has applied this test to the samples examined.—Amer. Jour. Pharm., June 1890, 284–289.

Sandarach—Production in Australia.—J. H. Maiden communicates an interesting paper on the production of sandarach in Australia. Ordinary sandarach exudes naturally, but the practice in Northern Africa is to stimulate the flow by making incisions in the stem, particularly near the base. In various parts of Australia and Tasmania there are vast numbers of *Callitris* trees; their resin, often abundant, can readily be collected, and the author is sure that, even with the cheap labor of Northern Africa to contend against, it can be profitably gathered during a portion of the year, by parties of men, or the families of settlers. All the native Australian sandarachs possess a pleasant aromatic odor, similar in character to that emitted by sandarach. When the trees are wounded the resin exudes in an almost colorless, transparent condition. It has obviously high refractive power, and is much like ordinary pine resin in taste, smell, and outward appearance, when the latter is freshly exuding. This transparent appearance is preserved for a considerable time, the resin meantime darkening a little with age. Old samples possess a mealy appearance, but this is merely superficial.

The sandarach, or gum juniper of commerce, is the product of a *Callitris* (*quadrivalvis*), and the latest classification of Australian sandarach trees (that of Baron von Mueller), places them under *Callitris* likewise. The author enumerates a number of Australian species of *Callitris* from which sandarach may be obtained as follows:

Callitris cupressiformis, Vent. Muell., "Cens.," p. 109. Syn. *C. australis* (ined.). *Frenela rhomboidea*, Endl. Var. *Tasmanica*, Benth. *F. Ventenatii*, Mirb., "B. Fl.," vi., and others.

Callitris calcarata, R. Br. Syn. *Frenela Endlicheri*, Parlat., "B. Fl.," vi. 238.

Callitris columellaris, F. v. M. Syn. *Frenela robusta*, A. Cunn., var. *microcarpa*, Benth. "B. Fl.," vi., 237.

Callitris verrucosa, R. Br. Syn. *Callitris Preissii*, Miq. *Frenela robusta*, A. Cunn, and others. "B. Fl.," vi., 236.

The exudations from each of these are described, but the following general description may find place here: The *Callitris* resins soften slightly, but do not melt in boiling water, and a sample of commercial sandarach behaves similarly. In the mouth they feel gritty to the teeth, and in no way different from sandarach. When freshly exuded they are very irritating to a cut. Pharm. Jour. and Trans., Jan. 18, 1890, 562–564.

Araucariæ—Oleo-Resinous Exudations of Different Species.—The oleoresinous exudations of the different species of *Araucaria* differ from those of other coniferæ in containing much gum. Heckel and Schlagdenhauffen found that the secreting glands at first contain oleo-resin. Afterward the neighboring cells form papillæ, projecting into the glands, and are converted into arabin, which mixes with the oleo-resin. The proportion of gum varies between 29 and 93 per cent., and it usually contains a little sugar. The gum-resin of *A. Bidwelli* yields to alcohol a crystalline body apparently identical with pinit of *Pinus lambertiana*. The oleo-resins and volatile oils are dextro-gyrate. The alcoholic solutions contain no inorganic matter, but the water-soluble portion leaves an ash of calcium chloride with some sulphates and carbonates, and little iron and manganese.—Amer. Jour. Pharm., April 1890, 177; from Compt. Rend., cix., 382.

Taxus baccata—Isolation of an Alkaloid, "Taxine," which see under "Organic Chemistry."

B. Animal Drugs.

Cantharides—Assay.—Nagelvoort proposes the following modified method for the estimation of cantharidin in cantharides: 10 gm. cantharides are moistened with a 10 per cent. soda lye, and put in a warm place for six hours. The mass is now acidified with hydrochloric acid, transferred to a Soxhlet's tube, and fully exhausted by means of chloroform (about 50 c.c.). After evaporating off the chloroform, the residue is freed from fat by means of carbon disulphide, and then redissolved in chloroform. The liquid is filtered off and evaporated to dryness at 79.5° C., when the cantharidin may be weighed.—Chem. and Drugg., Feb. 1, 1890, 154.

Blatta orientalis—Proper Characters for Medicinal Use.—L. Reuter in view of the probability that the discredit into which cock-roaches have fallen as a hydrogogue is due to the indifferent quality of the powdered insects as found in the market, has made experiments to determine the proper quality, and proposes the following definition: "The light, dry, scaly, fatty-feeling powder of the male and female animals, of gray to gray-brown color, and not unpleasant, vinous odor. 1 g. of the powder triturated with 2 g. of purified animal charcoal and 50 g. cold water, should, after maceration and frequent stirring for half an hour, yield a colorless or only faint yellow filtrate, which requires at least 20 c.c. of $\frac{1}{100}$ normal alkali for neutralization if the *Blattæ* have not contained more than 10 per cent. of moisture." "The Blatta powder should yield to ether at least 10 per cent. of a fatty, brown-yellow oil, from which, on standing for a short time, white masses should separate." "When mixed with an equal part of caustic lime, ammonia is developed, on the addition of water, in quantity sufficient to turn red litmus paper, held over it, intensely blue."—Arch. d. Pharm, 868–873.

Insecticide against Phylloxera—Preparation.—According to Kühl, an insecticide of especial value against the Phylloxera is made by saponifying any vegetable oil with sulphuric acid, incorporating carbon disulphide, and exactly neutralizing with an alkali. This preparation is as efficacious as pure carbon disulphide, but is not volatile and is miscible with water. In contact with water or moist soil, slow decomposition takes place with evolution of SO_2 and mercaptans, which latter increase the effectiveness.—Apotheker Ztg., 1889, 506.

"Eucalyptus" Honey—A Fraudulent Product.—L. Reuter draws attention to so-called "eucalyptus" honey, which has been introduced recently as a product of a variety of bees—*Apis mellifica, var. nigra*—upon eucalyptus trees in Australia, and which is said to have not only a pronounced taste of eucalyptus oil, but to contain as much as 17.1 per cent. of eucalyptol, eucalypten, terpen, etc., etc. The French introducers of this honey praise it highly as a therapeutic agent, and claim that it cannot be produced artificially from honey produced in France and eucalyptus oil or products—its characters being peculiar, due to the particular insects and the trees upon which it is found, and in all respects a natural product. The author now points out that the "Australian Journal of Pharmacy" has recently declared this so-called "eucalyptus" honey an artificial product, made from ordinary honey and eucalyptus oil, and that the French savants, who have hitherto praised and described it, have, to put it mildly, been imposed upon. His own inquiries, which have been made from the most eminent eucalyptologist of Australia—whose name he does not deem it necessary to connect with the controversy—develope that such a honey, having a pronounced taste of eucalyptus, has not been met with in an experience of 42 years in the eucalyptus forests of Australia, and is not at all likely to be found now.—Arch. d. Pharm., Oct. 1889, 873–876.

Honey—Observations of Dextrorotary Specimens.—C. Amthor and J. Stern examined two specimens of Alsatian honey, one from Neuweiler im Steinthal, rotation + 10.7° Laurent, and the other from Upper Alsatia, showing + 10.26° Laurent in a 200 mm. tube. The rotation was due to a dextrin, of which the former contained 6.1209 per cent. the latter 9.03 per cent. Both honeys were natural products.—Amer. Jour. Pharm., Jan. 1890, 13; from Zeitschr. f. angew. Chem., 1889, 575.

Beeswax—Detection of Paraffin, etc.—According to H. Hager, adulteration of beeswax with paraffin, ceresin, or ozokerite, can be easily determined by subjecting the sample to the influence of heat. In a small porcelain capsule of about 5 cm. diameter and 1 or 2 cm. depth, two grams of the wax, previously cut into shavings and dried by exposure to air, are placed and heated over a *small* flame; when vapors are evolved a beaker of same diameter as capsule and of ½ to ⅔ liter capacity is held over the capsule and completely filled with the vapor, when it is corked and set aside for condensation; a second beaker is filled in the same manner, and then the flame is removed. The condensation of the vapor requires about one hour, and when completed the deposit of one beaker is dissolved in 3 c.c. chloroform and poured into the second beaker, rinsing the first beaker with a small additional quantity of chloroform. With the chloroform solution of the sublimate the following tests are made: 1. One to 1½ c.c. are evaporated in a test-tube and, after adding 4 c.c. solution of sodium hydrate, heated to the boiling point; after cooling, the paraffin will float upon the colorless lye. 2. Several drops are allowed to evaporate spontaneously upon an object glass, and the residue examined microscopically; paraffin has the appearance of raised stars with curved or serpent-like rays. In this distillation the first portion of the vapor always consists of the paraffin, pure beeswax only producing volatile matter on heating to 300–320° C.; the sublimate from beeswax is always colored, the chloroform solution being decidedly colored; the soda lye is colored and also turbid; under the microscope the chloroform residue presents a wavy appearance without the stars. For a quantitative determination the results are only approximate; instead of 25 per cent. there were obtained in three determinations 22.38, 23 and 23.70 per cent.—Amer. Jour. Pharm., Nov. 1889, 564: from Pharm. Centralh., 1889, 565.

African Insect Wax—Description.—J. R. Jackson draws attention to an African insect wax, a sample of which has recently been received by a member of the staff of the "Chemist and Druggist," from a friend in South Africa, who had found it in Damaraland, where he described it as being used by the natives as a cement for calabashes (water-vessels, etc.). To prepare it, he says, it is exposed to the sun to partially melt or soften, when it is used to fill up cracks—apparently like putty—and as it hardens it forms an almost unbreakable cement. This peculiar substance is the product of an insect, and, though apparently common in Africa, is comparatively unknown out of that country. In the Kew Museums are samples of this wax, both in the natural state and melted and formed into balls; in the former condition it occurs in small irregular pieces, usually about the size of a pea, but sometimes in large agglomerated masses, composed of a number of such pieces. Some, however, are of a lengthened vermicular form, incrusting the spiny twigs of the mimosa upon which it has been formed. Many of these fragments have much the appearance of a caterpillar, and the whole of them are of a dirty white color.

One sample in the museum at Kew is labelled "Gian," or insect wax, from Natal; while another specimen is said to be from a species of mimosa, though the wax is by no means confined to this genus of plants, being found on a number of other trees. As it is stated that any quantity of the wax is procurable in Natal, it would be quite worth the while of some manufacturer to test its capabilities, when we might also hope to discover the insect which causes it.—Chem. and Drugg., May 17, 1890, 667.

Cuttle fish—An Important Chinese Industry.—One of the principal and perhaps most profitable industries of the Ningpo district is the ming fu, or cuttle-fish, trade. From the latter part of April until the closing days of June, a number of small and somewhat barren islands of the Chusan Archipelago, situated within a radius of fifty miles of Chinhae (at the mouth of the Yung river), swarm with men engaged in the occupations of cleaning and drying the fish for the Ningpo market, and the adjacent waters are literally covered with boats engaged in fishing. The number of boats which leave Ningpo and its immediate vicinity may be placed at 12,000, with an additional 2000 from the numerous small hamlets along the coast and larger islands of the Chusan group. Each boat carries an average crew of six men. The cuttle-fish boats are from 25 to 30 feet in length, with a beam of seven feet. They are furnished with a single lugsail, usually made of foreign T cloth, tanned with mangrove bark; they are worked with two, sometimes three, sculling-oars, with which the boats are propelled with astonishing speed. The boats, as a rule, work in pairs, a bamboo fastened at the bows of each to keep them separated, with a space of about 20 feet between. To the bamboo is attached the large net. Others, again, catch the fish by means of a square net fastened at the corners to the ends of two slender bamboos which cross at right angles, and sewed together in the middle. These bamboos, with the attached net, are suspended from a stout beam which projects some distance over the bow, and has fastened to the in-board end a heavy weight for facilitating the raising of the net. This is used in shallow water and principally at night, when a fire is kept burning in a pan in the bow of the boat to attract the fish. One or two men attend to the working of this net, while the rest of the crew are employed in scooping in the fish with hand-nets. The boat loaded, the fish are landed, cleaned, and sun-dried. The drying occupies about three days. They are then shipped in packages of about 333 lbs. each, by small junks to Ningpo. The cuttle-fish is called by the Chinese *wu tse* (black thief); *ming fu* is the commercial name of the fish when dried. The black liquid secreted by the fish was used as a substitute for ink, but was abandoned, as it faded after the lapse of a few years.—Abstract from Consular Reports, in Chem. and Drug., Dec. 14, 1889, 838.

Cod-Liver Oil—Statistics of the Norwegian Fisheries.—U. S. Vice Consul J. C. Isdahl reports some interesting statistics respecting the principal cod-fishing in Norway, which takes place in the district of Lofoten from middle of January to middle of April. This year's season (1889) finished with a result of 17,000,000 fish, 20,300 barrels of liver, 17,000 barrels of spawn, and 11,100 barrels of crude steam-rendered oil. The gross value of the catch is estimated at $1,554,500. The returns of last year's catch were 26,000,000 fish, 32,700 barrels of liver, 33,600 barrels of spawn, and 13,800 barrels of crude steam-rendered oil. The gross value of the same was estimated to be $1,600,000. In the year 1887 the fishing in Lofoten yielded 29,700,000 codfish; in 1886, 31,000,000; and in 1885, 26,600,000; this season's catch is thus the smallest for a number of years. The large deficiency is partly to be attributed to roughness of the weather during the fishing season, and partly to scarcity of fish present on the fishing grounds. It was repeatedly stated by the inspectorate of Lofoten, as a reason for the poor catch, that when the weather permitted fishing the fish remained in deep sea and did not run up on the banks, on account of a low temperature of the sea. This unusual phenomenon lasted during the whole season. The fish were this season of smaller size than last year; the fatness of the liver was, however, about the same, viz., from 250 to 350 fish per hectoliter of liver (hectoliter = 2.838 bushels). At the end of the season the liver of the fish is always leaner than in the beginning.—Amer. Drugg., Nov. 1889, 213.

Cod-Liver Oil—Presence and Importance of Albumin.—From recent experiments upon cod-liver oil, Unger draws the following conclusions: 1. In cod-liver oil the phosphorus and the iron contained in it are combined with albumin. 2. In the good qualities, the albuminoid bodies have undergone no alteration, whilst in the yellow and the brown qualities they gradually decompose. 3. These albuminoids become separated from the oil when carbonic acid is introduced into a mixture of the oil with water. 4. Pharmacists should require that the amount of free fat acid contained in the oil shall not exceed 4 to 5 per cent., and that the oil in contact with nitric acid of 1.40 shall form an albuminous ring in five hours.—Amer. Jour. Pharm., Nov. 1889, 560; from Jour. de Pharm. et de Chim., Sept. 1, 1889.

Yolk of Egg—Preservation.—Cyril D. Rosenkrans recommends the preservation of the yolk of eggs by carefully drying it upon glass plates, and keeping it in thin layers in paper boxes lined with paraffined paper. After several months it showed no tendency to rancidity or decomposition. Using this dried yolk for an emulsion, it is rubbed up in a mortar with a small quantity of sugar, then sufficient water is added to make a smooth paste, after which the oil and remaining water are incorporated with it in the usual manner.—Amer. Jour. Pharm., April 1890, 170.

Musk—Causes of Disuse in Medicine.—Dr. E. R. Squibb observes that the reputation of musk as a medicinal agent is based upon good authority, nevertheless it has fallen into disuse as a medicine, and evidently on account of its high price, the cost of pure musk being about one-fourth greater than that of gold. This high price has led to its adulteration to such an extent, that some of the price lists quote musk at ridiculously low figures, upon which physicians often base their opinion as to the price that should be charged by the dealer. The following stricture by the author is significant. Speaking of a physician who has lost his patient, possibly because the musk was not accessible, he continues: "He determines to be forearmed for the next case—say of adynamic diphtheria, in which Jacobi says musk is sometimes useful—and sends to his druggist to get some. The druggist may send him word that pure musk will cost him $30 per ounce, in which case, in nine times out of ten, the order will be countermanded, because he will find musk quoted on many lists," at less than one-third the price.—Ephemeris, July 1889, 1245–1246.

INORGANIC CHEMISTRY.

OXYGEN.

Oxygen—Estimation in Water Holding it in Solution.—Sir Henry E. Roscoe and Joseph Lunt, operating by Schutzenberger's process for the estimation of oxygen dissolved in water, find that a series of estimations made on the same sample of London tap water give results which differ 35 per cent. from the mean value, and that the time taken in titrating has a great influence, much higher results being obtained if titration be quickly than if it be slowly performed. The disturbing influence has been traced to the fact that when aërated water is introduced into an atmosphere of hydrogen, as in the usual process, it immediately begins to lose oxygen by diffusion, a fact hitherto overlooked. The result of an oxygen estimation thus depends on the degree of exposure to hydrogen during titration, and results between 0.53 and 7.56 were obtained with the same water by varying the exposure.

The method adopted to eliminate this error, due to diffusion, is to run the aërated water beneath the surface of a liquid containing a measured excess of hyposulphite, and a little reduced indigocarmine as an indicator. In this way the dissolved oxygen is immediately acted on by the hyposulphite and its diffusion prevented. For the standardization of the hyposulphite, the two methods hitherto used were found inaccurate—the copper method being fundamentally wrong owing to a secondary action which occurs between sulphite and dissolved oxygen. The aërated distilled water method, hitherto used with Bunsen's absorption coefficients, the authors show to be inaccurate, giving the values obtained by them, which agree closely with observations made by Dittmar.—Chem. News, Aug. 2, 1889, 59–60.

Oxygen—Preparation in Perfect Purity.—Dr. George Kassner states that oxygen may be obtained perfectly pure, and without the aid of heat, by dissolving 58 grams ferricyanide of potassium in as little water as possible and mixing with 100 c.c. of a 3 per cent. hydrogen peroxide solution; through a funnel-tube solution of potassium hydrate is added, when a steady evolution of oxygen occurs, ceasing as soon as a neutral solution is obtained, but capable of being revived by the addition of more KOH as long as ferricyanide and hydrogen peroxide are present in the generator. From the above quantities two liters of pure oxygen are obtainable; being generated in alkaline solution, chlorine and carbon dioxide cannot contaminate it. The solution in the generator contains only ferrocyanide of potassium.—Amer. Jour. Pharm., Nov. 1889, 565; from Pharm. Ztg., 1889, 1302 and 1338.

HYDROGEN.

Distilled Water—Removal of Ammonia.—A. G. Bloxam calls attention to a process for the removal of ammonia from distilled water, which obviates the troublesome distillation, and consists in simply boiling ordinary distilled water in a wide-necked flask for some time. The process was suggested to him by a chemist of considerable practice and reputation.—Chem. News, Jan. 17, 1890, 29.

Water—Presence of Lead.—R. Reynolds calls attention to the importance of allowing the water to remain in contact with the lead service pipe for a definite time before making examinations for lead. He points out that the quantity of lead taken up by an acid water might vary considerably with the conditions, and that therefore the results of an analysis of a water that had been subjected to a minimum influence might have no relation to the results obtained with the same kind of water after it had been submitted to more energetic or prolonged action. This was illustrated by the results obtained in the examination of a sample of water drawn at 7 a. m., when it had probably lain in contact with the pipes for some hours, which gave 0.35 grain of lead per gallon, and one drawn three hours after, which gave only 0.1 grain per gallon. Analysts should direct that samples of water intended for analysis should be left in contact with the ordinary service pipe for twenty-four hours.—Yearbook of Pharmacy, 1889, 425–434.

Water—Modification of Clarke's Soap Test for Estimating Hardness.—F. E. Nelson suggests that this solution can be made in the following manner: Dissolve 1 gm. of pure palmitic acid in a small volume of pure spirit, and neutralize with 4 c.c. normal soda solution (calc. equiv., 3.9 c.c). This volume of soda solution is equivalent to 4×50 mgms. $CaCO_3$, and is, therefore, diluted to 200 c.c., adding so much aqueous spirit that the percentage of alcohol in the standard solution amounts to 35. The solution gives constant results.—Chem. and Drugg., Feb. 1, 1890, 154.

Potable waters—Determination of Nitrites by Means of Apomorphine, which see under "Organic Chemistry."

Hydrates—Existence as Such in Solutions.—S. U. Pickering announces that he has succeeded in isolating in the solid crystalline form one of the hydrates of sulphuric acid, the existence of which in solutions he had lately predicted from a study of the densities and heat of dissolution of sulphuric acid solutions of different strengths. The new hydrate is $H_2SO_4,4H_2O$, containing 57.66 per cent. of acid. The proof of its existence depends on its having a definite melting-point at —25°, which is lowered (as far as about —70°) by the addition of excess of either water or sulphuric acid, and on other evidence which it is not convenient to give in the present place. The isolation of one of the hydrates with either 2, 4, 5, or $9H_2O$ had been rendered probable by a study of the freezing-points of sulphuric acid solutions; and the nature of the curves representing the freezing-points of solutions from which the tetrahydrate crystallizes renders it highly improbable that any other hydrate will be obtained in the solid form except, of course, the monohydrate, which has long been known. Such an absolute proof of the conclusions which he has drawn from other sources must place those conclusions beyond doubt, and must establish as an incontestable fact the existence of hydrates in solution.—Chem. News, Aug. 9, 1889, 68.

Peroxide of Hydrogen—Characters of the Commercial Solutions, etc.—Dr. E. R. Squibb calls attention to the value of hydrogen peroxide as a disinfectant and antiseptic in the treatment of disease, and the importance of seeing to it that its solutions are dispensed in a good condition, since they rapidly deteriorate by losing active oxygen. So long as the solution will yield any active oxygen at all, it will give this off with effervescence when poured on a crystal or two of permanganate of potassium. To test a solution, it is added to a measured quantity of 1.852 grams of permanganate of potassium in distilled water to make 500 c.c. Each cubic centimetre of this solution is equal to one volume of active oxygen when applied to 1 c.c. of any solution of peroxide of hydrogen to be tested. Into this, with constant stirring, is dropped the permanganate solution until the color of the permanganate ceases to be discharged. Each c.c. and fraction of a c.c. required to reach this point, indicates one volume and fraction of a volume of active oxygen that is available in the solution test. The best

Commercial Solutions of Peroxide of Hydrogen, which are usually simply designated as "peroxide of hydrogen," contain 15 per cent. by volume of the peroxide, preserved and protected by a little hydrochloric acid in the water used for its solution. Such solutions are colorless and odorless—or nearly odorless; have at first a simply mildly acidulous taste, but leaving afterwards an impression rather than a taste, which resembles nothing and is therefore indescribable.—Ephemeris, July 1889, 1146–1150.

Peroxide of Hydrogen—Methods for Determining the Strength of Its Solutions.—D. B. Dott makes some interesting remarks respecting the preparation, properties and methods for testing solutions of peroxide of hydrogen. The usual methods for its estimation depend upon the liberation of oxygen in the presence of manganese dioxide or potassium permanganate, and measuring its volume, a nitrometer being conveniently used for this purpose. The author has employed the same instrument filled with a solution of ordinary bleaching powder, which is to all intents and purposes a solution of calcium hypochlorite and calcium chloride, along with a small proportion of calcium hydroxide. The peroxide of hydrogen reacts with the hypochlorite, liberating oxygen, according to the equation $CaCl_2O_2 + 2H_2O_2 = CaCl_2 + 2H_2O + 2O_2$.

To obtain a very accurate result one would require to know the vapor-tension of the solution employed, and the amount of oxygen dissolved under the particular conditions; but for practical commercial purposes these factors might probably be disregarded. Another method by which peroxide may be easily enough estimated is by its action in liberating iodine from potassium iodide, the iodine being then titrated with standard thiosulphate. In his experience these methods yield appreciably different results, and he thinks it would be worth while for some one who has the time to investigate the matter, and so determine which of the various methods affords the most trustworthy means of estimating peroxide of hydrogen. The hypochlorite process seems to give rather higher results than the permanganate, and as there is no obvious source of error appertaining to the former, it is probably the more accurate of the two. In any case it is always useful to have an alternative method. It was noted by Hanriott that Fehling's solution is reduced by peroxide of hydrogen. The accuracy of this statement he has confirmed, and there is little doubt that the reduction of the cupric solution might be used as a means of estimating the peroxide if it were more convenient to employ that method.—Pharm. Jour. and Trans., April 12, 1890, 835–836.

Hydrogen Peroxide—New Characteristic Reaction.—G. Denigès finds that an aqueous solution of ammonium molybdate (10 per cent.) to which an equal volume of concentrated sulphuric acid is added, gives, on the addition of a few drops of oxygenated water, an intense yellow coloration resembling that of the alkaline dichromates. It enables us to detect 1-10th mgm. of hydrogen peroxide.—Chem. News, May 30, 1890, 265; from Compt. rend., May 12, 1890.

Peroxide of Hydrogen—Test.—A. O. Gawalowski recommends as a test for hydrogen peroxide that the solution to be tested be made alkaline and then a soluble neutral salt of lead or copper added; a deep brown red precipitate, rapidly changing to red and finally to white, indicates hydrogen peroxide; in concentrated solutions effervescence is also to be observed. Ozone solution (Lender's) does not give this test.—Rundschau, 1890, 79.

Hydrogen Peroxide—Action upon the Oxy-Compounds of Manganese.—A. Gorgen finds, contrary to the usual opinion, that in contact with pure crystalline dioxide of manganese hydrogen peroxide does not split up instantly, but requires about an hour; the effect upon the dioxide varies according as the oxygenated water is slightly alkaline or more or less acid. In experiments where hydrated manganous oxide was put in contact with an excess of oxygenated water, the degree of oxidation reached exceeds that of Mn_2O_3.—Chem. News, May 9, 1890, 228; from Compt. rend., April 21, 1890.

Hydrogen Peroxide—Action upon Permanganates, etc.—According to A. Gorgen, under the influence of hydrogen peroxide a solution of permanganic acid is gradually decolorized, whilst heat and oxygen are evolved and the peroxide is deposited. In contact with oxygenated water the alkaline permanganates are gradually decolorized, whilst there is precipitated a peroxide containing a large proportion of alkali.—Chem. News, May 23, 1890, 254; from Compt. rend., May 5, 1890.

NITROGEN.

Nitrogen—Preparation in the Cold from Atmospheric Air.—Berthelot utilizes the reaction of copper in presence of ammonia for the absorption of the oxygen from atmospheric air in the cold. Nitrogen remains, and is displaced by means of water completely freed from oxygen by the same reactions. The gas is freed from traces of nitrite and from ammonia by a passage over potassa, or better, soda lime, first in the liquid and then in the solid state, and afterwards over pumice steeped in sulphuric acid.—Chem. News, Jan. 31, 1890, 61: from Bull. Soc. Chim. de Paris, 1889, No. 10.

Nitrogen Compounds—Resorcin a Convenient and Delicate Reagent for their Presence in Sulphuric Acid.—According to John Henry Wilson, both the ferrous sulphate test and the permanganate test for the presence of nitrous compounds in sulphuric acid are liable to be misleading. He has found a far better test for these compounds in the vitriol in resorcin. It is a reagent delicate and easy of application, which gives results immediately; and unlike the permanganate and the ferrous sulphate tests, the color produced is permanent. If a minute quantity of resorcin, taken up on the point of a penknife, be dropped into a cubic centimetre of sulphuric acid, previously diluted with 5 c.c. of water, a yellow color is immediately produced if any nitrous compounds are present, which is more or less intense according to the quantity. In the author's hands this test has proved extremely delicate and convenient, far more so than either of the tests mentioned above, or of that recommended by Frankland, viz., the sulphanillic acid, phenol and ammonia test.

The resorcin test may be made *quantitative* in the following easy manner: 1 c.c. of the acid to be tested is diluted with 5 c.c. of water, allowed to cool, and a minute portion of resorcin is dropped into it and stirred with a glass rod until it is dissolved. The color is noted. To 1 c.c. of pure acid, which has been proved not to give any color on the addition of resorcin, diluted as above (1 to 5), a solution of potassic nitrite of known strength is added; then a minute quantity of resorcin is dropped into it, and the color produced—after the resorcin has had time to dissolve, which only takes a few seconds—is compared with that of the sample to which the test has been added. If it be deeper, it is only necessary to add to another portion of acid less of the potassic nitrite solution; if paler, more of the potassic nitrite solution, until the color produced equals that of the sample of acid under examination.—Pharm. Jour. and Trans., Jan. 11, 1890, 541–542.

Nitrous Acid—Solidification.—According to Fl. Birhans, to solidify anhydrous nitrous acid, though still containing small quantities of hyponitric acid, there is required a temperature of —52° to —54°, obtained by the evaporation of methyl chloride in a current of dry air. To obtain anhydrous nitrous acid free from hyponitric acid, the author has operated similarly to Fritsche, but at a lower temperature. It forms a fine blue liquid, which was solidified only by the cold produced by a mixture of methyl chloride and carbonic acid in the flocculent state. This mixture, according to the experiments of Cailletet and Colardeau, lowers the temperature to —82°.—Chem. News, July 26, 1889, 49; from Compt. rend., July 8, 1889.

Nitrites—Determination in Potable Waters by Means of Apomorphine, which see under "Organic Chemistry."

Alkaline Nitrites—Preparation.—Le Roy makes the alkaline nitrites by mixing the finely-powdered alkaline nitrate with finely-powdered barium sulphide in the proportion of 4 molecules of the former to 1 of the latter. The mixture is heated with constant stirring in an iron basin to dull redness. The reaction takes place with incandescence, and on extracting the cooled mass with water the nitrite dissolves, and barium sulphate is left, and can again be reduced to sulphide. The presence of sulphate in the sulphide moderates the reaction.—Chem. and Drugg., Feb. 1, 1890, 154.

Sodium Nitrite—Manufacture.—J. V. Esop states that the usual methods for the manufacture of sodium nitrite are based on the reduction of sodium nitrate by means of lead. For this purpose, the latter is fused and poured on iron plates in thin layers. After cooling, the lead plates are rolled up and weighed out in parcels for use. The lead should be free from zinc and antimony. The sodium nitrate is then fused in shallow cast-iron pans fitted with a mechanical agitator, and when the mass is thoroughly fused two and a half parts of lead are added at short intervals for each part of sodium nitrate (95–96 per cent. $NaNO_3$). The reduction ensues immediately. The thin leaves of lead fuse easily, and are oxidized to yellow lead oxide (litharge). After some time a further amount of lead is added, as an excess of lead is necessary, and the agitation of the fused mass is continued for at least three-quarters of an hour, in order to obtain a product of high strength. The mass has a tendency to stick to the sides, and great care must be exercised to remove these crusts with an iron spatula, as the slightest inattention causes the burning through of the pan. If the crusts turn reddish, it is a certain sign that the pan is in great danger of being destroyed. These crusts must at once be covered by a fresh quantity of nitrate, and the fire withdrawn if necessary. The whole process of fusion is finished in about three and a half hours. A sample drawn should test at least ninety per cent. of sodium nitrite. The mass after cooling is lixiviated in wrought-iron tanks with water or weak liquor. As soon as the solution stands at 36° to 38° B., it is siphoned off and neutralized with nitric acid of 1.029 specific gravity. The liquor is then concentrated to 42° or 43° B., allowed to clarify for three or four hours, and ultimately run into lead-lined wooden tanks. Crystals of a light yellow color quickly make their appearance, which are deprived of their adherent moisture in the customary manner. The mother liquor, in conjunction with other liquors, is again boiled down to crystallization. In this way crystals are obtained of the following percentage:

	Sodium Nitrite: $NaNO_2$. Per cent.
1st crystallization	95.0 to 95.5
2d "	94.8 " 95.0
3d "	94.2 " 94.5
4th "	94.0 " 94.2

By drying at 60° C. their percentage is increased to 96 per cent. If a purer product be required, it must be re-crystallized. Some difficulty is experienced in working up the mother liquor. If crystals of only 94 per cent. of $NaNO_2$, or below that strength, be obtained, the mother liquors must be concentrated by themselves in pan No. 2. Here crystals, containing 86 to 92 per cent. of $NaNO_2$, are produced, which are employed for enriching the strength of fresh liquors. If the crystals from pan No. 2 sink below 80 per cent., their mother liquors must be concentrated separately in pan No. 3, whereby crystals containing 50 to 75 per cent. of $NaNO_2$ are obtained. These serve for enriching the liquors in pan No. 2. Weaker crystals are returned to the melting pot and treated with lead.

The lead oxide, obtained as a by-product, is washed, and afterwards converted into the different lead preparations of commerce, or reduced to metallic lead, when it returns to the process.—Amer. Drugg., Oct. 1889, 196; from Zeitschr. f. ang. Chem.

Nitric Acid—Reduction to Ammonia and Determination as Such.—E. Boyer describes a method for the reduction of nitric acid to ammonia and its determination as such. The solutions of nitrate to be reduced should contain at most 5 gm. of a pure nitrate in 100 c.c. The author takes a test-tube closed at one end, 0.30 metre long and 0.022 in diameter, with a spout at its upper end, and introduces 5 gm. of zinc of the size of a pea, a quantity sufficient to cover the bottom of the tube. He takes, then, 10 c.c. of the solution, corresponding to 0.5 gm. of nitrate, and introduces it into the tube, keeping the lower end of the pipette near the bottom of the tube, so as not to splash the sides. He then introduces 5 c.c. of hydrochloric acid of sp. gr. 1.19, letting it run down the sides of the tube, and agitates it circularly. The hydrogen is given off at all points of the bottom of the tube and traverses the solution uniformly from bottom to top. When the escape of hydrogen has nearly ceased, he adds again 5 c.c. of hydrochloric acid, which completes the reduction of the nitric acid to ammonia. In ten minutes the reduction is complete. The liquid contained in the tube then consists of a mixture of hydrochloric acid, ammonia, zinc chloride, and undissolved zinc. This mixture is distilled with caustic magnesia in Schlœsing's apparatus, and the ammonia is collected and determined in the usual manner.—Chem. News., May 23, 1890, 253; from Compt. rend., May 5, 1890.

Nitrates—Resorcin a Delicate Test.—See "Resorcin," under "Organic Chemistry."

SULPHUR.

Sulphur—Compound Nature.— Dr. Theodor Gross announces that sulphur, as well as some other substances at present considered to be elements, are really compounds of carbon, and he has communicated the following evidence in support of his view respecting sulphur, to the Vienna Academy of Sciences. A thin layer of precipitated sulphur, heated in a porcelain dish to ignition and then allowed to burn slowly, left a black skin, which when incinerated in the air without flame fell to a pale grey-brown powder amounting to about 0.2 per cent. of the original material. One part of this was placed in forty parts of potassium hydrate fused in a silver dish, five parts of potassium chlorate added, and the whole heated until it no longer frothed. The fuse, when treated with water, gave a flocculent precipitate, and the liquid, filtered off, gave with hydrochloric acid a relatively large quantity of carbonic acid. Upon heating the precipitate in dilute hydrochloric acid, with some nitric acid added, it dissolved all but a slight residue containing silver, and in this solution potash or ammonia produced a light flocculent precipitate readily soluble in acids. Sulphuretted hydrogen produced, after excess of alkali had been neutralized by potash, a light brown flocculent precipitate, which could be washed with hot water. This precipitate, according to Dr. Gross, contains a new body, the only known constituent being copper in traces. The dried precipitate when fused under access of air formed granules which had the appearance of melted selenium and amounted to about 2.5 per cent. of the pale brown powder obtained from the precipitated sulphur. Incinerated strongly for a minute in a current of hydrogen, 2.7 centigrams lost 3 milligrams. The mass dissolved in hot strong nitric acid, and ammonia added to this solution in excess, produced a precipitate that after being washed was readily soluble in dilute nitric acid. In this solution sulphuretted hydrogen again threw down a light brown precipitate, insoluble in potash or ammonia. The author thinks this substance cannot be an impurity, but that it is a carbon compound which is a decomposition product of the sulphur, and that the behavior of precipitated sulphur under the conditions stated is related to the different modifications of sulphur.—Pharm. Jour. and Trans., Nov. 30, 1889, 421; from Chem. Ztg., Nov. 6, 1889, 1476.

Sulphur—Igniting-Point.—Referring to a letter of Mr. Bertram Blount (Chem. News, Feb. 14, 1890,) in which he remarks that the statements respecting the igniting-point of sulphur in the published authorities are widely apart, ranging from 115° C. to 293° C., J. Rutherford Hill records some experiments, from which it appears that the igniting-point of sulphur in air is 248° C., and that the temperature stated by Watt (250° C.) is most nearly correct. It may be noted that the sulphur used was sublimed sulphur of ascertained purity and free from moisture.—Pharm. Jour. and Trans., March 1, 1890, 722–723.

Sulphur—Proper Use as a Disinfectant by Burning.—Dr. E. R. Squibb, in view of the fact that the efficacy and utility of burning sulphur as a disinfectant has of late years been called in question by several prominent authorities, calls attention to the fact that its inefficacy is due to the fact that by the manner of burning usually practiced, dry sulphur dioxide is formed, whereas it becomes active only in the presence of moisture. Hence he advises to evaporate water to the extent of three or four times the weight of the sulphur burned when fumigating with sulphur, or to wet the surfaces to be disinfected, or both. A shallow pan of water upon a kerosene stove well started in advance of igniting the sulphur, and the floor, ceiling and walls sprinkled with water by means of an ordinary dust-brush, is perhaps as good a practice as any. There is abundant evidence on record that sulphurous acid in small amount is destructive to all the lower orders of animal and vegetable life, to all fermentation, both vital and chemical; and all that the more recent elaborate investigations seem to have shown in contradiction, is that the spores or germs of *certain* microscopic organisms were not destroyed by it. Burning sulphur for disinfection should by no means be abandoned, but should be more thoroughly and carefully applied.—"Ephemeris," July, 1889, 1141–1145.

Pyrites—Determination of Copper and Arsenic.—R. Nahnsen recommends the following processes for determining copper and arsenic in pyrites: For the

Determination of Copper, 12.5 gm. of the dry finely pulverized sample are placed in a beaker of thin glass 17 centimetres in height, and covered with 10 c.c. water and 1 c.c. strong sulphuric acid. Keeping the glass covered with a porcelain capsule, nitric acid of specific gravity 1.4 is gradually added until effervescence no longer occurs. The liquid is let boil over a moderately strong flame, the porcelain capsule is removed, and the liquid is boiled, whilst being frequently shaken round and round until it becomes tough and scarcely yields to shaking, and yellow saline particles begin to separate out. The paste is then quickly brought into solution by means of warm water, which should be kept ready at hand. The cold solution is transferred to a 250 c.c. flask, filled up, and filtered through a dry filter. 200 c.c. (=10 gm. pyrites) of the solution thus freed from silica and lead are treated for some hours with a brisk current of sulphuretted hydrogen until the precipitate clots together and the liquid appears transparent. It is filtered and washed with pure water, whilst being frequently crushed with a glass rod. Sulphuretted hydrogen water is here unnecessary if the sulphuretted hydrogen has been allowed to act until the liquid appears quite clear. The portion of the precipitate on the filter is rinsed back with a minimum of hot water to the main mass, and so much strong solution of sodium sulphide is added that the liquid, after being heated to a boil for a few minutes, shows no undissolved sulphur. It is diluted with hot water, let stand in a warm place until clear; the solution which contains the arsenic and antimony, and is quite free from copper, is filtered off, and the deposit of copper sulphide is washed with hot water. Traces of iron sulphide which still adhere to the copper sulphide are removed by hot water to which a few drops of hydrochloric acid have been added, the residue is washed until free from chlorine, and the copper determined as sulphide. The copper sulphide is tested for the presence of cadmium or bismuth by dissolving it in nitric acid and treating the solution for some time with ammonium carbonate in heat. The precipitate formed is weighed as oxide and deducted. For the

Determination of Arsenic the dissolved sulphuretted hydrogen is expelled from 200 c.c. of solution by a current of carbonic acid, and arsenic sulphide is extracted from the washed precipitate by means of ammonia. The further treatment may be conducted volumetrically or gravimetrically. —Chem. News, Sept. 13, 1889, 133; from Chem. Ztg.

Sulphuretted Hydrogen—Construction of a Simple Apparatus.—Remove the cork and piston of a glass syringe, fill it to within a third of the large opening with morsels of sulphide of iron of about the size of a pea, and fit to the same orifice a rubber tube connecting with a glass syphon. To the small opening of the syringe attach a piece of rubber tubing connecting with a glass tube furnished with a stopcock. The latter being opened, the syringe is placed in a conical glass vessel containing a sufficient quantity of hydrochloric acid to cover the iron salt. The gas commences at once to form. To stop the disengagement of gas, close the stopcock. The syringe is then placed in a jar of pure water, and, the cock being again opened, the apparatus becomes filled with water, and chloride of iron is dissolved. —Amer. Jour. Pharm., June 1890, 300; from Bull. de la Soc. de Phar., Brussels, Feb. 15, 1890.

Sulphuretted Hydrogen—Glycerin a Preservative.—Alfred J. Shilton has made experiments to determine the correctness of the statement (first made by Lepage?) that glycerin exerts preservative action in solutions of sulphuretted hydrogen. He made up two solutions, both preserved in the same way:

(a) Containing 50 c.c. of saturated solution of sulphuretted hydrogen in water;

(b) Containing 55 c.c. of the same solution, but with 1 c.c. of glycerin in addition.

When opened about four months afterward, the bottle (a) had lost its odor completely and gave no precipitate with a salt of lead, but the bottle (b) which contained the glycerin, had a strong odor, and gave a copious precipitate with lead acetate.—Chem. News, Nov. 15, 1889, 235.

Sodium Thiosulphate—Behavior with Acids.—W. Vaubel having noticed that by the decomposition of this salt by acids, small quantities of hydrogen sulphide were sometimes formed, has carefully studied its behavior towards acids. With formic, acetic, succinic, citric, hydrobromic, hydriodic, hydrofluoric, nitric, sulphurous, dithionic, phosphoric, and very dilute sulphuric acids, the amount of sulphurous anhydride and sulphur obtained always agrees with that required for the equation $Na_2S_2O_3 + 2AcOH = 2AcONA + H_2O + SO_2 + S$. But with stronger sulphuric acid this is not the case. In a series of experiments where 10 mols. of sulphuric acid of various degrees of concentration were employed to 1 mol. of sodium thiosulphate, and the reaction completed in the cold, the sulphurous anhydride evolved varied from 74 per cent. of the theoretical with acid of 20 per cent. to 92 per cent. With acid of 90 per cent., the precipitated sulphur more nearly approached the theoretical quantities. But with 100 per cent. sulphuric acid, the percentage of sulphurous anhydride fell to 45.4 per cent., that of precipitated sulphur to 9.15 per cent., whilst much less than the theoretical quantity of sulphuric acid was neutralized. In the last named reaction the evolution of hydrogen sulphide was very noticeable. With more dilute acid, it was often detected, but was estimated with the sulphurous anhydride. From his results the author concludes that the decomposition of thiosulphuric acid is not the simple one generally believed, but that the first phase is a decomposition into hydrogen sulphide and sulphuric anhydride, which then further react on each other.—Amer. Jour. Pharm., Nov. 1889, 583–584; from Ber. d. D. Chem. Ges., XXII., 1686–1694, through Jour. Chem. Soc., 1889, 943.

Thiosulphate of Sodium—Detection in Bicarbonate of Sodium.—For the detection of thiosulphate in bicarbonate of sodium, F. Musset recommends the following process: 5 gm. bicarbonate of sodium and 0.1 gm. calomel are triturated with 2 drops of distilled water, when, if the impurity is present, the mixture will be colored gray, due to formation of mercuric sulphide.—Amer. Jour. Phar., June, 1890, 294; from Pharm. Centralhalle, 1890, 230.

Sulphites and Thiosulphates—Preparation, etc.—H. Schwicker has prepared and examined numerous sulphites and thiosulphates, and concludes from his experiments that these compounds have an asymmetrical constitution. The following are among the compounds described:

Sodium potassium sulphite, $NaKSO_3+2H_2O$, separates in yellowish crystals, when a concentrated solution of potassium hydrogen sulphite is neutralized with the calculated quantity of sodium carbonate, and evaporated over sulphuric acid.

Potassium sodium sulphite, $KNaSO_3 + H_2O$, prepared from sodium hydrogen sulphite and potassium carbonate in like manner, is a yellowish, crystalline compound.

The salt $HKNa_2(SO_3)_2 + 4H_2O$, separates in large, well-defined plates, when a solution of equivalent quantities of sodium potassium sulphite and sodium hydrogen sulphite, or a solution of sodium hydrogen sulphite (2 mols.) and potassium carbonate (0.5 mol.) is evaporated. It is moderately stable in the cold, but is quickly decomposed when heated. It is readily soluble in water, the solution having an acid reaction, and concentrated solutions combine with acetone with development of heat.

The compound $HNaK_2(SO_3)_2 + 3H_2O$ separates in transparent prisms when a concentrated solution of equivalent quantities of sodium potassium sulphite and potassium hydrogen sulphite is evaporated over sulphuric acid; it behaves like the double salts described above.

Sodium ammonium sulphite, $H(NH_4)Na_2(SO_3)_2 + 4H_2O$, separates in colorless crystals when ammonia is passed into a concentrated solution of sodium hydrogen sulphite, or when a concentrated solution of ammonium hydrogen sulphite is partially saturated with sodium carbonate. It crystallizes in large plates, and is moderately stable at the ordinary temperature, but at 130° it is quickly decomposed with evolution of water, ammonia, and sulphurous anhydride.

Sodium potassium thiosulphate, $SNa.SO_2.OK + 2H_2O$, is obtained in large, transparent plates, when a freshly-prepared concentrated solution of ammonium pentasulphide is added to a solution of sodium potassium sulphide (see above) until a permanent yellow coloration is produced, the ammonia expelled by boiling, and the filtered solution evaporated on the water-bath.

Potassium sodium thiosulphate, $SK.SO_2.ONa + 2H_2O$, prepared from potassium sodium sulphite (see above) in like manner, crystallizes in small colorless plates, melts at about 62°, and is very readily (105.3 per cent. at 15°) soluble in water.

Potassium silver thiosulphate, $KAgS_2O_3 + NH_3$, separates in nacreous plates when a solution of either of the sodium potassium thiosulphates, or of potassium thiosulphate, is mixed with an equivalent quantity of an ammoniacal silver nitrate solution. It is very sparingly soluble in water, and silver sulphide quickly separates from the solution, but it dissolves freely in hot ammonia, and crystallizes from the cold solution in large plates. It is stable at the ordinary temperature, but at 100° ammonia is evolved and a gray powder remains.

Sodium silver thiosulphate, $NaAgS_2O_3 + H_2O$, is obtained in large, well-defined, monoclinic plates, when a solution of equivalent quantities of sodium thiosulphate and ammoniacal silver nitrate is evaporated over sulphuric acid. It decomposes only slowly at the ordinary temperature, but immediately on heating; at 100° only water is evolved, and a gray crystalline powder remains. It is very sparingly soluble in water, and the solution is unstable, but it dissolves freely in cold ammonia.—Amer. Jour. Pharm., Nov. 1889, 584–586; from Ber. d. D. Chem. Ges., xxii., 1728–1737, through Jour. Chem. Soc., 1889, 942.

Sulphites—Preparation and Characters of the Various Compounds.—P. J. Hartog describes the condition under which various sulphites are obtained:

Normal Potassium Sulphite is obtained by dissolving 100 grams of potassium hydroxide in 200 c.c. of water free from oxygen, saturating with sulphurous anhydride, and then adding a further quantity of 100 grams of potassium hydroxide dissolved in as little water as possible. The solution is evaporated in a vacuum, and the crystals are drained on cotton wool in an atmosphere of nitrogen. Since the salt is less soluble in hot water than in cold, it is advisable to keep the funnel warm when collecting the crystals. The sulphite is thus obtained in small, anhydrous, hexagonal prisms with basal modifications. It is deliquescent, but oxidizes less rapidly than its solution; heat of dissolution —1.75 Cal.

Normal Sodium Sulphite is obtained in the same way in anhydrous crystals of the same form, always mixed, however, with a certain proportion of the heptahydrated salt; heat of dissolution + 2.71.

Sodium-Potassium Sulphite, $NaKSO_3$, is obtained in crystals, which resemble those of the simple anhydrous salts, by adding potassium hydroxide to sodium anhydrosulphite. When the solution of the double sulphite has been partially oxidized, and is then gradually concentrated, the crystals which separate are first heptahydrated sodium sulphite, then the double sulphite, and lastly potassium sulphate; hence it would seem that at first the potassium sulphite alone undergoes oxidation. Heat of dissolution of the double salt—1.19 Cal.; heat of dissolution of hydrated sodium sulphite in a solution of potassium sulphite—11.01 Cal.; heat of formation of the double sulphite + 3.76 Cal.

Various other double salts are described, some of them being easily dissociated, and all presenting more or less difficulty in their production.—Amer. Jour. Pharm., March 1890, 150–152; from Compt. rend. cix., through Jour. Chem. Soc., Dec. 1889, 1106.

Sulphurous Acid—Production during Vinous Fermentation.—The formation of sulphurous acid as a product of the alcoholic fermentation was discovered in beer, and quite recently by Dr. B. Haas in wines. It is not a constant product, but is formed by the reduction of sulphates, present in the wort or must if the fermentation proceeds very slowly; if the fermentation is a quick one, no sulphurous acid is produced. The SO_2 can be estimated by distilling the liquors in a current of CO_2, collecting the distillate in a solution of iodine, and precipitating the sulphate formed with barium chloride.—Ztschr. f. Nahrungsm. Unters., 1889, 241.

Per-Sulphuric Acid—Availability for the Production of Hydrogen Peroxide.—M. Traube communicates a number of reactions of per-sulphuric acid with various substances, which seem to prove its availability for the production of hydrogen peroxide.—Amer. Jour. Pharm., Dec. 1889, 620–621; from Ber. d. D. Chem. Ges., xxii., 1518–1528, through Jour. Chem. Soc., 1889, 940.

SELENIUM.

Selenious Acid—Physiological Action.—C. Chabrie and L. Lapicque communicate the results of investigations concerning the physiological action of selenious acid. A dose of selenious acid a little above two-thousandths is needed to hinder the fermentation of meat-broth under the action of the ordinary microbia of the air. With smaller proportions fermentation is set up and the selenious acid is reduced. Sulphites injected into the blood of an animal are converted into sulphates, which have no poisonous action. The selenites are not oxidized under similar conditions. In the higher animals selenious acid has a very considerable poisonous action. Dogs die when they have received 3 mgms. of neutral sodium selenite per kilo of their weight. There is intense congestion of all the viscera. The heart is arrested in systole.—Chem. News, May 30, 1890, 265; from Bull. Soc. Chim., Paris, 1890, No. 5.

CHLORINE.

Chlorine—Determination in the Ash of Plants.—To determine chlorine in the ash of plants, Ad. Jolles carbonizes 10 gm. of the sample at a low temperature, grinds up the carbon, and moistens it with an alcoholic solution of sodium carbonate (the strength of the alcohol and the proportion of the salt are not given). The alcohol is then burnt off, the carbon pulverized again, soaked again as before, and burnt off twice or thrice, and finally incinerated at dull redness. About 0.5 gm. of the ash is perfectly extracted with cold water containing nitric acid, the silica is separated, though in what manner the author does not mention, the filtrate is run into a quarter litre flask and filled up to the mark. 25 c.c. of the liquid are then accurately neutralized and the chlorine is determined by titration.—Chem. News, May 9, 1890, 229; from Ztsch. f. Nahrungsm., Unters. through Ztsch. Anal. Chem., 1889, No. 6, 742.

Chlorine—Rapid Determination in Sulphocyanide of Potassium, which see under "Cyanogen Compounds."

Chlorinated Lime—Constitution, Action of Alcohol, etc.—E. Koefœd has made experiments upon chlorinated lime to ascertain if it contain the compound $CaOCl_2$, or if it be a mixture of calcium chloride and hypochlorite. His conclusions are that chlorinated lime contains both chloride and hypochlorite of calcium, and are based upon the following two observations: (1) If an aqueous solution of bleaching powder be dialyzed, the dialysate will contain approximately twice as much calcium chloride as hypochlorite. (2) Chlorinated lime, treated with water, will yield to the solvent considerably more calcium chloride than calcium hypochlorite. These experiments would indicate a mechanical mixture of the two salts, and not a definite chemical compound.

The action of *bleaching powder* upon *alcohol* was also reinvestigated, with these results: If a clear solution of the bleaching powder be warmed with alcohol there will be liberated small quantities of chlorine and oxygen, with formation of calcium carbonate and hydrate; calcium formate could not be detected among the products. The experiments lead him to results indicating that from 3 molecules calcium hypochlorite there are formed 1 molecule chloroform, 1 molecule calcium carbonate, and ½ molecule calcium hydrate; writing alcohol as CH_3—CH_2OH, the CH_3 group is chlorinated to form $CHCl$, while the group CH_2OH is changed by oxidation into CO_2 and H_2O.—Pharm. Ztg., 1889, 747.

Chlorinated Lime—Chlorimetric Assay.—E. A. and J. G. Spenzer communicate the results of a chlorimetric assay of four commercial samples of chlorinated lime. The method pursued by the authors is that of Penot as modified by Fresenius, and is based upon the conversion of arsenious acid into arsenic acid, being effected in an alkaline solution; starch-and-iodide-of-potassium paper is employed to ascertain the end reaction. The arsenious acid solution, from the danger of deteriorating unless perfectly pure, was freshly prepared; each c.c. of this solution contains 0.004436 gm. of arsenious acid, corresponding to 1 c.c. of chlorine at 0° C. and 760 mm. barometer pressure. The number of c.c. of arsenious acid solution used, multiplied by 2, gives the chlorimetric degrees, which multiplied by 3.17763 gives the percentage of chlorine in the chloride of lime, viz.:

	Degree.		Multiple.	Percentage.
1 c.c. of arsenic solution required	42.6 = 85.2°	×	3.17763	27.07
2 " " " "	42.4 = 84.8°	×	3.17763	26.94
3 " " " "	42.2 = 84.4°	×	3.17763	26.81
4 " " " "	41.6 = 83.2°	×	3.17763	26.43
Bulk " " "	33 = 66°	×	3.17763	20.97

Only in the sample of the bulk did it fall below the pharmacopœial per cent. (at least 25 per cent.).—Amer. Drugg., July 1889, 128; from Proc. Ohio Phar. Assoc., 1889.

Chlorides—Test Paper Suitable for their Detection.—Hoogvliet recommends the following method for making test paper for the detection of chlorides: A solution of potassium chromate is precipitated by silver nitrate and the silver chromate redissolved by adding a few drops of ammonia. Bibulous paper is saturated with this solution and, while still moist, drawn through a very dilute nitric acid; the dilute acid causes the precipitation of silver chromate upon the fibres and a paper of uniform red color results. If such paper be immersed in a solution containing chlorides, the red silver chromate is converted into white silver chloride and the paper becomes colorless; 3 parts of a chloride in 10,000 parts solution can be recognized. The reagent, because of its simplicity, is advanced for industrial and household purposes.—Apoth. Ztg., 1890, 165; from Pharm. Weekblad.

Potassium Chlorate—Identification in Legal Cases.— According to Vitali, the following reactions serve for the identification of potassium chlorate in legal cases: 1. A few crystals in a test tube treated with one or two drops concentrated HCl produce a yellowish-green coloration, and the suffocating odor of chlorine; on adding a few drops of the turbid, brownish mixture obtained by mixing a dilute gold solution with a dilute oxalic acid solution and warming, chlorate is indicated by the finely divided gold immediately dissolving with formation of a yellowish solution; nitrates will not dissolve the precipitated gold. 2. One drop concentrated $H\,SO_4$, to which a minute fragment of the salt has been added, on stirring with a glass rod assumes an orange-red color, which on addition of one drop benzole becomes green, afterwards sky-blue; with nitrates only a faint yellowish coloration is produced. 3. Sulphuric acid and the salt, as before, with a trace of aniline or one of its salts, forming a beautiful blue-violet coloration, intensified by addition of a little water, also proves the presence of chlorate.—Pharm. Centralh., 1889, 328; from L' Orosi.

BROMINE.

Bromine—Effect of Carbolic Acid (which see under "Organic Chemistry") to counteract its action.

Hydrobromic Acid—Preparation.—For the preparation of hydrobromic acid, A. Recoura causes sulphuretted hydrogen, furnished by a continuous apparatus, to pass through bromine in a tall narrow bottle, surmounted by a stratum of water, or preferably of hydrobromic acid. The gas which issues from this bottle, which is hydrobromic acid, traverses a second bottle containing a solution of potassium bromide, holding a little red phosphorus in suspension. This second bottle entirely arrests all vapors of free bromine escaping from the first bottle. The gas given off does not contain a trace of hydrogen sulphide, and is always pure hydrobromic acid, however rapid the current.—Chem. News, May 2, 1890, 216; from Compt. rend., April 14, 1890.

IODINE.

Iodine—Purification.—According to F. Musset, iodine may be purified as follows: A convenient quantity of iodine is placed in a beaker and covered with a concentrated solution of iodide of potassium, the beaker covered with a watch crystal, and heat applied until the iodine melts; the melting point of iodine is below the boiling point of the iodide of potassium solution, and hence the operation proceeds nicely. After the beaker and contents become cool, the iodine-cake is removed, broken up, and after draining in a funnel, washed with water. The product is free from chlorine and is easier obtained in this condition than by resublimation; the mother liquor is reserved for future operations.—Amer. Jour. Pharm., June 1890, 294; from Pharm. Centralhalle, 1890, 230.

Iodine—State of Aggregation in its Solutions.—The solutions of iodine are divided into two classes—the brown solutions (alcohol, ether, &c.) and the violet solutions (carbon disulphide, chloroform, benzene, &c.). Henri Gautier and George Charpy have treated iodine with fifteen solvents, and they arrange the colors in a series from violet to brown. The absorption-spectra of the solutions vary also in a continuous manner. In the violet solutions they show a spectrum approaching that of the vapor of iodine, but the dark band begins, not in the red, but in the yellow, and encroaches a little more upon the blue than in the vapor of iodine. In the succeeding groups the displacement of the dark band on the side of the violet is intensified. The authors conclude that the mol. of iodine which, in the brown solutions, corresponds to I_4, is gradually split up so as to approximate to I_2, which corresponds to iodine in the state of vapor. This hypothesis appears to be supported by the influence exerted by temperature upon the color of the solutions.—Chem. News, Feb. 21, 1890, 97; from Compt. rend., Jan. 27, 1890.

Iodine—Determination by Means of Ferric Chloride.—Prof. E. Reichardt has experimented to determine the accuracy of the method of Duflos to determine iodine in hydriodic acid, and iodides by the aid of ferric chloride, which depends upon the reduction of the latter to ferrous chloride, volatilization and collection of liberated iodine in iodide of potassium solution, and titration by hyposulphite solution. His experiments show that the method—which is given in detail in Fresenius' Quantitative Analysis—is reliable, but that the use of ordinary cork for the flask connections exerts an unfavorable influence, and should be substituted by paraffin-corks or ground glass stoppers.—Arch. d. Phar., July 1889, 642–645.

Iodine—Determination and Percentage in Certain Algae.—L. von Itallie has obtained reactions for iodine by Flückiger's method with as little as 10 grams of *Chondrus crispus* and 3 grams *Fucus vesiculosus.* Quantitatively the latter was treated as follows: 50 grams of the powdered plant were macerated for eight days with 40 per cent. alcohol, strained, and washed with alcohol until colorless. The liquid was neutralized with sodium carbonate, evaporated to syrupy consistency, absolute alcohol added, and the precipitate washed with alcohol. The filtrate was evaporated, residue dissolved in water, and treated in a separating funnel with dilute sulphuric acid containing nitrous acid, and the iodine taken up with chloroform. The solution was washed a number of times with water to remove the nitrous acid and the iodine titrated with $\frac{1}{100}$ sodium thiosulphate solution. The author found 0.01078 per cent. iodine.—Arch. d. Pharm., Dec., 1889, 1132–1134.

Ammonium Iodide—Restoration of the Decomposed Salt to its Original White Condition.—John C. Falk states that iodide of ammonium which has become dissolved from liberation of iodine can be restored to its original whiteness and perfect condition by exposing it to the vapor of ammonium carbonate. A lump of this, enveloped in filter paper, is placed in the bottle containing the iodide, when, in a few days or weeks, according to the degree in which decomposition has advanced, the salt becomes perfectly white. The jar or bottle is then left open until the excess of ammonia has disappeared, when the iodide will be restored to practical purity and is fit for use.—Amer. Jour. Pharm., Sept. 1889, 464–465.

Iodide of Ammonium--Decolorization of its Solution by Means of Starch.—Solutions of iodide of ammonium are colorless when recently prepared, but soon become yellow, owing to a portion of the iodine being set free. Ammonia may be used as a decolorant, but an excess is required; hyposulphite of sodium acts well, but introduces too much tetrathionite of sodium; ether and chloroform, also, are used, but these are not perfectly soluble in water. Soucheire recommends that a small quantity of fecula be added to the solution of ammonium iodide, which is then well shaken and filtered. The iodide of starch thus formed remains upon the filter. The filtered solution contains no dissolved fecula; if a drop of tincture of iodine be added to it, no deposit or blue coloration is observed.—Amer. Jour. Pharm., Jan. 1890, 18; from Bull. de la Soc. de Phar. du Sud-Ouest., Aug. 1889.

Sodium Iodide—Variability in Proportions of Water.—Dr. Laborderie calls attention to the fact that sodium iodide occurs in commerce in three forms, containing very variable proportions of water of crystallization. The crystallized iodide contains 20 per cent., the "dried" from 7.5 to 18 per cent., and that in scales 6 to 10 per cent. Under these circumstances he thinks it not surprising that there should be considerable difference in the activity of medicines containing this compound, according as one or other of the varieties is used in dispensing, and he therefore recommends that only the crystallized iodide should be used, its composition being constant. It may be mentioned that the form of sodium iodide official in the Codex is in cubic crystals.—Pharm. Jour. and Trans., May 31, 1890, 978; from Deut. Med. Woch., May 8, 1890.

Potassium Iodide—Examination for Nitrate.—O. Schwarz examines potassium iodide for nitrate as follows: 0.5 gm. of the sample, 1 gm. ground copper sulphate, and 0.8 gm. ground sodium sulphite are placed in a test-tube and covered with 10 c.c. water. The mixture is heated over the naked flame until all the iodine has been separated out as white copper iodide, and the supernatant liquid has a bluish color. In the filtrate, nitric acid, if present, may be detected by the ordinary reagents.—Chem. News, May 9, 1890, 229; from Pharm. Ztg., through Ztschr. Anal. Chem., 1889, No. 6, 750.

SLUORINE.

Fluorine—Specific Gravity.—At the Academy of Sciences sitting of December 2, 1889, Professor Troost read a memoir by Moissan on the direct determination of fluorine's density, and showed at the same time the new apparatus employed therefor. The gas is isolated, according to Moissan's process, by the electrolysis of anhydrous hydrofluoric acid held in a U-shaped platinum tube cooled by means of methyl-chloride to —50° C. (58° below zero, Fahr.) Although hydrofluoric acid is much less volatile than fluorine, to remove all traces of the acid liable to be mechanically carried off the gas is first passed through a platinum spherical cooler kept at —50° C., and through a platinum tube filled with sodium-fluoride fragments, which will absorb all free hydrofluoric acid. Next the gas is slowly introduced into a platinum specific gravity flask filled with dry nitrogen, which it displaces owing to its superior density. And, finally, the specific gravity having been observed by direct weighing, the figures are corrected by ascertaining by analysis the quantity of nitrogen left in with the fluorine. The numbers so far obtained were 1.262 and 1.270, or somewhat less than the theoretical figures calculated from fluorine compounds. The discrepancy, Moissan suspects, is possibly owing to some incorrection in the equivalent adopted for fluorine, and to set this point right will be the object of future investigations.—Chem. and Drug., Dec. 14, 1889, 820.

Hydrofluosilicic and Fluoboric Acids—Antifermentive Properties.—F. J. Homeyer states that hydrofluosilicic and fluoboric acids (H_2SiF_6 and HBF_4), as well as their soluble salts, possess in a very marked degree the property of preventing fermentations. A 10 per cent. glucose solution, to which 4 per cent. yeast had been added, did not show any signs of decomposition when kept for weeks at 30° to 35° C., if 0.1 to 0.5 per cent. of the calcium salts of the above acids were present. Grape juice, with 0.2 per cent. of the same salts, will keep well at 30° to 35°; starch paste, under the same conditions, remains also unchanged.—Pharm. Ztg., 1889, 761.

Sodium Silicofluoride—Caution Respecting Its Internal Use.—Sodium silico-fluoride was introduced some time ago as a powerful non-poisonous antiseptic, and statements were made that a saturated solution containing 0.61 per cent. of the salt was non-irritating. Large doses of the solid compound were admitted to act as an emetic, but it was reported that as much as seven grains had been taken as a dose, though perhaps it was not desirable to take more than one-half to one grain. On account of these statements a research was undertaken by Mr. Bokenham, on behalf of the Therapeutic Committee of the British Medical Association, to determine the germicidal value of the compound when given internally. In some preliminary experiments it was found that a 1 in 750 solution entirely prevented fermentation, but that a 1 in 900 solution only delayed fermentation for a time, and, therefore, could not be considered truly antiseptic. In the proportion of 1 in 3000 or 1 in 2000 it was quite without effect on the growth of bacillus anthracis in nutrient gelatin, and there was no diminution in the virulence of bacilli cultivated through several generations on this pabulum. ·Injection of small quantities of the salt in solution into the stomachs of guinea-pigs through an œsophageal tube was followed by the death of the animals, in one case fifty-five minutes after the injection of 0.033 gram, and in the other on the fourth day after the administration of 0.29 gram in divided doses. Mr. Bokenham experimented with the compound on his own person. After a mixed meal 0.05 of sodium silicofluoride was taken; in about an hour this dose was followed by great nausea, with eructations, which lasted several hours; the pulse was at the same time greatly slowed and the tension reduced. The experiment was repeated by three other persons, who each suffered from nausea, with eructations. Mr. Bokenham therefore thinks that his experience may make others hesitate before they recommend the use of sodium silicofluoride internally.—Pharm. Jour. and Trans., March 1, 1890, 712; from Brit. Med. Jour., Feb. 15, 1890, 355.

PHOSPHORUS.

Phosphorus Chlorides—Method of Distinction.—G. Denigès distinguishes between phosphorus oxychloride and trichloride by the following easy method: A very small quantity of zinc powder is put in a very dry glass tube and a few drops of the liquid in question is poured upon it. The trichloride is without sensible action, whilst, with the oxychloride, there is immediately a brisk reaction. The grey zinc-powder turns to a dirty green, then to a yellow. If water is added, with agitation, the zinc dissolves in the case of the trichloride, forming a liquid almost colorless. With the oxychloride the oxide P_4O remains unchanged, and the color of the liquid is darkened.—Chem. News, March 7, 1890, 120; from Bull. Soc. Chim., Paris, 1889, No. 12.

Phosphonium Sulphate—Existence.—According to A. Besson, if dry gaseous hydrogen phosphide is passed through pure sulphuric acid refrigerated down to —20° or 25° it is absorbed in quantity, and the liquid becomes syrupy. The product of the reaction is stable, and may be preserved if kept at some degrees below 0°. If the syrupy liquid is decanted out of the tube in which the reaction has taken place, a solid white mass is found at the bottom, which seems to be crystalline phosphonium sulphate. —Chem. News, Nov. 15, 1889, from Compt. rend., Oct. 21, 1889.

Hypophosphorous Acid, U. F. B. P. C.—

Take of—

Hypophosphite of barium	8 oz.
(Containing not less than 95 per cent. $Ba2(PH_2O_2)H_2O$).	
Diluted sulphuric acid	of each a sufficient quantity.
Distilled water . . .	

Dissolve the hypophosphite of barium in 36 fluidounces of hot distilled water. Add slowly to the solution 17 fluidounces of diluted sulphuric acid, after which continue the addition, drop by drop, until no further turbidity is produced. Set aside in a warm place, and pass the clear liquid through a filter. Wash the precipitate by decantation with successive portions of hot distilled water, until the washings have no longer an acid reaction. Filter, unite the filtrates, and evaporate the liquid on a water-bath to the prescribed density. The product will weigh about 11½ ounces.

Characters and Tests.—Colorless. Specific gravity, 1.1367. Its strength, as determined by volumetric solution of soda, corresponds to 30 per cent. of hypophosphorous acid. Its aqueous solution is not precipitated by diluted sulphuric acid, nor by an excess of ammonia, nor by oxalate of ammonia after neutralization, and gives not more than a faint opalescence with chloride of barium. If solution of ammonio-sulphate of magnesium be added after an excess of ammonia, no precipitate is produced. Chloride of calcium added to a neutralized solution yields no precipitate.—Yearbook of Pharmacy, 1889, 225–226.

Hypophosphorous Acid—Oxidation by Palladium Hydride in the Absence of Oxygen.—R. Engel states that palladium hydride determines the oxidation of hypophosphorous acid, yielding phosphorous acid and liberating hydrogen. The hydride seizes an atom of the hydrogen of the hypophosphorous acid and gives it up again immediately in the free state. The residue of the hypophosphorous acid completes its molecule by decomposing water, fixing hydroxyl, and liberating a further atom of hydrogen. The action seems to continue indefinitely. With 0.5 gm. of palladium hydride the author has decomposed the phosphorous acid from 500 gm. barium hyposulphite, without any decrease in the activity of the precipitate. —Chem. News, May 2, 1890, 216; from Compt. rend., April 14, 1890.

Hypophosphorous Acid—Formation of Soluble Alkaloidal Hypophosphites, which see under "Organic Chemistry."

Hypophosphorous Acid and Hypophosphites—Method for Estimation.—Frank X. Moerk observes that for the estimation of hypophosphites the same methods are recommended as for the estimation of phosphites; they are two in number: 1. Conversion of the acids or salts into phosphoric acid or phosphate, estimating this and calculating then to the acid or salt used. 2. Determination of the reducing action by use of mercuric chloride in excess, weighing the mercurous chloride formed, and calculating to original substance. While these methods give good results, if working with pure substances, no mention is made of the determination of both in a mixture. A study of the reactions involved in these processes shows that hypophosphorous acid, H_3PO_2, has twice the reducing action of phosphorous acid, H_3PO_3; hence, should H_3PO_3 be present with H_3PO_2, two molecules H_3PO_3 will always be expressed as one molecule H_3PO_2. By oxidation, however, the two molecules of H_3PO_3 will form two molecules H_3PO_4, which by the first method will then be calculated as two molecules of H_3PO_2; so by this determination a larger amount of H_3PO_2 will be obtained compared with that found by the reducing action, and this excess will represent one molecule of H_3PO_2 formed from two molecules H_3PO_3; the calculation as H_3PO_3 can then be made by the proportion:

$$H_3PO_2 : 2\ H_3PO_3 :: \text{the difference} : x.$$

The author's experiments embraced the oxidation of the hypophosphite by the aid of permanganate, and by bromine, as well as upon its reducing action on mercuric chloride. While the latter process is possibly more convenient for the purposes of the pharmacist, he finds the following, depending on the oxidation of the hypophosphite by bromine, to give the most satisfactory results: 0.2 to 0.3 gm. of the hypophosphite are mixed with 100 c.c. water in a covered beaker and bromine added, a few drops at a time, until the color no longer disappears even after application of a moderate heat; the excess of bromine is removed by boiling the solution until free from color (no fear need be entertained of a loss of acid, as a very dilute acid solution, such as this, loses upon boiling only water until the acid becomes so concentrated as to contain 47 per cent. HBr), 15 c.c. of a *neutral* 10 per cent. calcium chloride solution and a few drops of phenolphthalein solution added and then titrated with normal sodium hydrate. By multiplying the number of c.c. of NaOH required by the following factors, which represent the quantities of hypophosphites corresponding to 1 c.c. NaOH, the quantity of hypophosphite will be obtained:

For	$Ca(H_2PO_2)_2$	multiply	by	0.014166
"	NaH_2PO_2	"	"	0.014666
"	KH_2PO_2	"	"	0.016850
"	$Fe_2(H_2PO_2)_6$	"	"	0.013940

The sodium hydrate solution must be accurately standardized, as a slight error will make a considerable difference if expressed as percentage of hypophosphite.

The addition of the calcium chloride is made to correctly indicate the reaction of the solution; phosphoric acid titrated with sodium hydrate solution will indicate an *alkaline* reaction before all of it has been changed into Na_2HPO_4, although this is an *acid* salt; by the addition of $CaCl_2$ there is formed the *acid* salt, $CaHPO_4$, which has an *acid* reaction, and which by addition of NaOH is changed into the normal calcium phosphate with neutral reaction. This method must only be applied in neutral solutions; should the hypophosphite have an acid or alkaline reaction, the amount of acid or alkali required to neutralize must be ascertained and allowed for in the above method. For this reason hypophosphorous acid was not placed in the above list; its estimation is easily effected by subtracting the number of c.c. of NaOH required for neutralization of the acid from the total number of c.c. of NaOH required after oxidation with bromine, and multiplying the remaining number of c.c. of NaOH by 0.011.—Amer. Jour. Pharm., July 1889, 326–332.

Officinal Hypophosphites—Examination.—In a second paper Mr. Moerk gives the details of examination of the officinal hypophosphites, viz., the calcium, potassium, sodium, and ferric hypophosphites. Respecting the

Ferric Hypophosphite the author observes that two methods for its preparation have been published: 1. By double decomposition of ferrous sulphate and calcium hypophosphite. 2. By double decomposition of solution of ferric chloride or sulphate and sodium hypophosphite. The first method does not produce the normal salt, while the second method, when attempted with aqueous solution, suffers from the circumstance that in its recently precipitated condition the ferric hypophosphite is soluble in water, and is lost during the process of washing. It must therefore be made with certain precautions which are indicated in the following process, which yields a very pure salt:

Calcium hypophosphite	30 gm.
Solution of ferric chloride	49.5 gm.
Distilled water, a sufficient quantity.	

The calcium salt with 100 c.c. water is placed in a flask and the iron solution gradually added, shaking after each addition. The ferric hypophosphite first forms a magma, but, after a little time, separates as an agglutinated mass which must be disintegrated by brisk agitation. Agitation must be resorted to from time to time until the precipitate becomes crystalline and loses all tendency to cake, which change will require at least twenty-four hours; a better yield is probably obtained by allowing to stand two or even three days before filtering and washing. The washings are tested for Ca by addition of ammonium oxalate, and as long as a precipitate is obtained washing must be continued. It was noticed that as the washings became free from Ca they came through the filter a little cloudy, and allowed to run into the vessel containing the first portions of the filtrate, after a little time, a distinct although a small precipitate was formed, due to the dissolved ferric hypophosphite being reprecipitated by the presence of a small quantity of calcium hypophosphite in the first filtrate. Using the above quantities and allowing to stand three days before filtering, there was obtained a yield of 93 per cent. based upon the quantity of ferric chloride used.—Ibid, Aug. 1889, 386–395.

In his third and concluding paper, in which the method for the examination of "hypophosphorous acid" is considered, the author sums up the results of his experiments and studies as follows: 1. The hypophosphites and the acid are not prone to as rapid oxidation as has hitherto been believed. 2. With ordinary precautions and observation of the several suggestions offered in the author's papers, the preparation of medicinally pure salts and of the acid need be no more difficult than those of other substances in the U. S. P. 3. Should the acid be made officinal, one of 50 per cent. would be the most desirable strength and which can easily be prepared without oxidation taking place; in this case the U. S. P. should adopt at least the specific gravity and neutralization determinations as tests of purity, the former, however, depending much upon the process of preparation.—Ibid, Sept. 1889, 459–463.

Phosphates—Determination of Ferric Oxide and Alumina.—E. Glaser recommends the following method for the determination of ferric oxide and alumina in phosphates: 5 gm. of the sample are dissolved in the ordinary manner in 25 c.c. of nitric acid at 1.2 specific gravity and about 12 c.c. of hydrochloric acid of specific gravity 1.12, and the whole is made up to 500 c.c. Of the filtered liquid 100 c.c. are put in a ¼ litre flask and 25 c.c. of sulphuric acid of specific gravity 1.84 are added. The flask is let stand for about five minutes, it is shaken several times, about 100 c.c of alcohol at 95° are added, the flask is cooled and filled up to the mark with alcohol, and shaken briskly. There is produced a contraction. The stopper is withdrawn, more alcohol added, and the flask is again shaken. It is let stand for half an hour and filtered; 100 c.c. of the filtrate (representing 0.4 gm. of the sample) are evaporated in a platinum capsule until all the alcohol is expelled. To the liquid thus freed from alcohol 50 c.c. of water are added in a cylindrical glass and heated to boiling. Ammonia is added until an alkaline reaction appears (not during the boiling.) The excess of ammonia is expelled at a boil, the liquid is let cool, filtered, the precipitate washed with hot water, ignited, and the ferric and aluminum phosphates are weighed.—Chem. News, April 11, 1890, 181; from Ztschr. Angew. Chem.

BORON.

Boron—Action of Chlorine.—Henry C. C. Maisch, after describing the method employed by him for isolating boron (see Proceedings 1889, 532–533), describes some experiments made to determine its behavior towards chlorine. The apparatus which was used was the following: A hard glass tube, as used for combustions, about 4 to 8 inches longer than the combustion furnace to be used, is drawn out at one end and bent almost at right angles. This part is attached to a Peligot's tube, which is surrounded by a freezing mixture of ice and salt. All the necessary joints are made by means of smooth and closely-fitting corks. The air-dry boron is loosely spread in the combustion tube, so that it is one-fourth inch in thickness all through; and as the boron must be thoroughly dry the water is driven out by heating in a stream of hydrogen, also allowing it to cool in the same. Carbonic acid cannot be used, as boron reduces it completely to carbon monoxide, as noticed by Lorenz (*Ann. Chem.*, 1889, ccxlvii, p. 226). After the tube has cooled the hydrogen is forced out by a stream of dry air, and the larger end of the tube then connected with a chlorine generator. The chlorine is prepared from manganese dioxide and hydrochloric acid, and best regulated so that a slow but steady stream is obtained. The whole apparatus is filled with washed and dried chlorine gas before heat is applied, sufficient for producing a slight glow in the tube. A liquid having the color of chlorine gas condenses in the Peligot's tube, which is best connected with a good drawing chimney, as some of the trichloride goes through uncondensed. The color of the liquid is due to dissolved chlorine, which is removed by shaking the liquid with mercury in a sealed tube, which can also be used for distilling. After the liquid has become perfectly colorless, which takes about two days, the tube is opened and by means of a closely-fitting cork a narrow glass tube, twice bent at right angles, is attached. The one arm of the tube which is used as a condenser is to be about 20 inches long, and projects to the bottom of the receiving vessel, which is surrounded by a freezing mixture of ice and salt. The best receiver is a wide glass tube about 25 inches long and about 5 inches below the orifice drawn out, so that the condensing tube just moves freely in the opening. The distillation is best carried on by means of warm water, very slowly, so as not to lose too much of the chloride—this boiling at 18° C. The yield of the chloride by this process is as follows: By using 8 gm. of magnesium powder for reduction, the boron gave 15 gm. of the chloride, the theoretical yield being 26 gm.—Amer. Jour. Pharm., Dec. 1889, 602–604.

SILICIUM.

Silicon—Determination in Crude Iron.—For the determination of silicon in crude iron and in spiegeleisen, Clerc places in a flask holding from 350 to 400 c.c., 4 gm. of the metal as finely pulverized as possible, along with 15–20 c.c. of water, 8–10 c. c. of pure bromine, and 75 c.c. of pure hydrochloric acid, and heats to about 100° on the sand-bath. The silicon is oxidized, and the iron and manganese pass into solution. If the heating is continued until the volume of the liquid is reduced to 40–50 c.c., the process is completed. The liquid is diluted with 200–300 c.c. hot water, filtered and the insoluble residue is incinerated, when the silica is obtained white and pure. The error does not exceed 0.001–0.002 per cent.—Chem. News, March 7, 1890, 121; from Soc. de l'Ind. Minerale.

Silicon Chloride—Quick Method of Preparation.—H. N. Warren recommends the following expeditious method for making silicon chloride: Selecting "silicon-eisen" containing about 15 per cent. of silicon, this is introduced into a deep clay retort provided with a tubulure, and connected with an apparatus evolving dry chlorine gas, the pipe conveying the gas passing nearly to the bottom of the retort, while the stem of the same was connected to a suitable adapter, maintained at the required heat by the aid of hot water, and intended to condense or retain the volatile ferric chloride which would naturally accompany the silicon chloride, the end or termination of the adapter being further connected with a suitable refrigerator containing a mixture of salt and ice in order to collect the volatile tetrachloride of silicon, $SiCl_4$. The retort and its contents being now raised to redness by the aid of ignited charcoal, and the chlorine thus allowed to play into the same, almost immediately the dense greenish-yellow vapor of gaseous ferric chloride is observed traversing the space within the adapter, and speedily condensing into the form of brilliant plates upon the walls of the same, while at the more remote end is observed the condensation of the silicon chloride, not unfrequently contaminated by the presence of small quantities of ferric chloride, which may, however, be entirely removed by subjecting the latter to distillation. From silicon-eisen the chloride can also be obtained in the same manner by substituting gaseous hydrochloric acid for the chlorine, which has the further advantage that the non-volatile ferrous chloride formed remains in the retort as residue.—Chem. News, Sept. 27, 1889, 158.

Native Wyoming Soap—Composition.—Herman Westphal draws attention to a mineral, known locally under the name of "Native Wyoming Soap," which occurs in the Blue Ridge, Wyoming Territory. It is found in two distinct forms, a *wet* and a *dry* variety.

The wet variety is found in sink holes and in the neighborhood of springs. It forms a thick, very tenacious pasty mass, about the consistency of butter. Its color is light yellowish gray. Taste slightly saline, clay-like. Odor argillaceous. Moistened between the fingers with a little water, it feels like soap or some greasy substance: hence its name. This soapy feel is probably due to the extreme fineness of the silicates which it contains.

The dry variety occurs underground in veins like coal. It is hard and dry, and looks very much like chalk; the color is somewhat darker, varying from yellowish-white to dirty greenish-yellow. On addition of a little water, however, it is converted into the soft variety as found on the surface of the earth. The dry-air soap reduced to an impalpable powder gave the following composition on analysis:

SiO_2	61.08	per cent.
Fe_2O_3	3.71	"
Al_2O_3	17.12	"
MnO	traces	
CaO	2.96	"
MgO	1.82	"
Na_2O	0.20	"
SO_3	0.88	"
H_2O	12.10	"
Total	99.87	"

—Amer. Jour. Pharm., Dec. 1889, 613–614.

Glass—Solubility.—L. Reuter's observations of the solvent action of chloral upon the blue pigment of glass (see *Chloral*, under "Organic Chemistry") has led R. Reynolds to record his experience in a similar direction. He mentions that a solution of 1 : 10,000 of hydrochloric acid in water, which when freshly made gave a distinct reaction with congo paper, failed to do so after being kept a day in a flint glass bottle. This result he was inclined to refer to the chemical interference of the bottle with its contents. The decomposition of hydrocyanic acid when kept in white flint bottles would appear to be due to the influence of the glass, and it would be interesting to know if any of the troublesome cases of decomposition of organic solutions, such as those intended for hypodermic use, are in any instance referable to this cause. In the discussion which followed the reading of this paper, Dr. Thresh referred to an observation that a "rainfall," which when collected on litmus paper he had found to be invariably acid, was either neutral or faintly alkaline when collected in a bottle.—Yearbook of Pharm., 1889, 368–371.

Glass—Solubility in Water.—F. Mylius and F. Foerster communicate the results of experiments made to determine the solubility in hot and cold water of a large variety of glasses of very varying composition, and deduce from their experiments the following conclusions:

(1) Water-glass is decomposed by water into free alkali and silicic acid, a certain proportion (varying with the time of action, concentration and temperature) of the latter becoming hydrated and dissolved.

(2) Potash-glasses are far less soluble than soda-glasses, but the difference decreases with increase of the proportion of lime present.

(3) Soda and potash are united in glass both to the silica and the lime. The resistance of glass towards the action of water is dependent on the presence of double silicates of soda or potash and lime.

(4) Of all sorts of glass, the plumbiferous flint-glasses are least soluble in boiling water.

(5) The relative resistance of glasses is different towards hot and cold water.

Tables are given in the original, showing the solubility as determined by digestion with boiling water for five hours, of various glasses commonly found in commerce, and the chemical composition of the same glasses.—Ber. d. D. Chem. Ges., xxii., 1092–1112; from Jour. Chem. Soc., Sept. 1889, 828.

CARBON.

Charcoals—Oxidizing and Decolorizing Properties.—P. Cazeneuve observes that if the decolorizing properties of charcoals are chiefly due to a mechanical fixation of the colors upon the carbonaceous matter, we must not overlook the action of the oxygen condensed in the pores in a state comparable to ozone. This oxygen has a destructive action upon certain colors, whilst, on the contrary, it determines the appearance of others which are products of oxidation.—Chem. News, May 2, 1890, 216; from Compt. rend., April 14, 1890.

Carbon Bisulphide—Method of Purification.—Ignatius Singer describes an improved form of furnace and retorts for the manufacture of carbon bisulphide on the large scale. The crude product obtained contains considerable quantities of sulphur, H_2S, and other sulphur compounds, has a pale yellow color and a very disagreeable odor. The author recommends the following method for its purification: A cylindrical vessel about 30 inches in diameter and 6 feet high is provided with a perforated coil of lead pipe at the bottom. The CS_2 to be purified is run into this vessel to about one-third its height. Then lime water is pumped into the vessel through the perforated coil. The lime water being specifically lighter than the CS_2 rises to the surface, and while traversing the body of the bisulphide in a finely divided spray, the lime combines with the H_2S, etc. This washing is continued until the lime water which leaves the vessel through an overflow pipe near the top, is perfectly clear. The CS_2 is now run into a still, about 1 per cent. of cheap colorless oil added and covered with a layer of about 1 inch of water to which some sugar of lead may be added. The CS_2 is now distilled in a water-bath and condensed in the usual way.—Amer. Jour. Pharm., Sept. 1889, 468; from Jour. Soc. Chem. Industry.

CYANOGEN COMPOUNDS.

Hydrocyanic Acid (Scheele), U. F. B. P. C.—

Take of—

Ferrocyanide of potassium	2¼ oz.
Sulphuric acid	1 fluid oz.
Distilled water, 24 fl. oz., or a sufficient quantity.	

Dissolve the ferrocyanide of potassium in 10 ounces of the water, then add the sulphuric acid, previously diluted with 4 ounces of the water and cooled. Put the solution into a flask, to which are attached a condenser and a receiver arranged for distillation, and having previously put 1 ounce of distilled water into the receiver, and provided efficient means for keeping the condenser and receiver cold, cautiously apply heat to the flask, until by slow distillation the liquid in the receiver is increased to 10 fluid ounces. Add to the product as much water as may be sufficient to bring the acid to the required strength.

Characters and Tests.—A colorless liquid. Specific gravity, 0.994. A fluid drachm of it leaves on evaporation no fixed residue. It gives no precipitate with chloride of barium, but with nitrate of silver it yields a white precipitate, entirely soluble in boiling concentrated nitric acid. Its strength, as determined by the process of the British Pharmacopœia by means of volumetric solution of nitrate of silver, corresponds to 4 per cent. of hydrocyanic acid.—Yearbook of Pharm., 1889, 525.

Acid. Hydrocyan. Dil., B. P.—Examination of Commercial Samples.—Alexander Leys reports on the examination of nine commercial samples of dilute hydrocyanic acid by the method of the B. P., his results being given as follows:

1	1.92	per cent. HCN
2	1.87	"
3	1.78	"
4	1.71	"
5	1.63	"
6	1.41	"
7	1.33	"
8	1.27	"
9	0.94	"

This gives a maximum of 1.92 per cent., and a minimum of 0.94 per cent., showing a difference of almost 1 per cent. Four estimations of each sample were made; the first roughly, the remaining three with greater care. The above figures represent the mean of the last two estimations.—Pharm. Jour. and Trans., April 5, 1890, 824–825.

Hydrocyanic Acid—Variability in Strength.—R. Wright has examined twelve commercial samples of Scheele's hydrocyanic acid, and found the amount of absolute acid to range between 3.6 and 5.7 per cent.—Yearbook of Pharm., 1889, 507–508.

Hydrocyanic Acid—Amount Present in Wild Cherry Bark and its Preparations. See *Wild Cherry*, under "Materia Medica."

Hydrocyanic Acid—Localization of the Principles Necessary to its Formation in Plants.—It has hitherto been an open question why a formation of hydrocyanic acid does not take place in the living plant, as, for instance, in the bitter almond, before or at maturity. To assist in clearing up this question, by determining the localization of the principles upon which the formation of hydrocyanic acid depends, Guignard has submitted cherry laurel leaves and almonds to a thorough microscopical examination. In the cherry laurel leaf the emulsin was found to be contained in the special cells representing the endoderm of the vascular bundles of the leaf-nerves, as well as in the non-sclerified cells of the pericycle that occur sometimes isolated and sometimes combined with the endodermic sheath. In the young branches the localization is similar, but the endodermic cells do not there form a sheath so continuous and distinctly defined in relation to the neighboring tissues. In the almond the emulsin is contained in the pericycle in the central cylinder of the axile portion. In the cotyledonary bundles the case is the same, with the difference that there a small quantity is found also in the endoderm.—Pharm. Jour. and Trans., May 3, 1890, 892; from Compt. rend., 1890, 477.

Cyanide of Mercury and Zinc—A New Antiseptic.—Sir Joseph Lister proposes the double cyanide of mercury and zinc, the exact composition of which is uncertain, as an efficient antiseptic. It is prepared as follows: A soluble double cyanide of mercury and potassium is dissolved, and to it a soluble salt of zinc is added; the precipitate formed is the double cyanide, which should be well washed with water to free it from any soluble cyanides, as they cause irritation and suppuration if placed on a wound in the shape of gauze. One in 2,000 of double cyanide keeps blood serum and corpuscles from putrefaction, but if the wound has developed bacteria a much stronger solution or powder or gauze must be used. In other words, the double cyanide has a strong inhibitory but a weak germicidal power. Gauze is prepared in the following way: The double cyanide is triturated with starch, and water is added to this, the result being a somewhat leather-like mass. The water is strained off, and to the mixture of double cyanide and starch, sulphate of potassium is added. This enables the mixture to be easily powdered, and, when it is dry, it is a fine white powder. In order to fix this powder on gauze 3 per cent. or 5 per cent. of it is suspended in a 1-in-4000 solution of mercuric chloride, when, by the agency of the starch, it sticks so firmly that it cannot be washed off except with difficulty. —Chem. and Drugg., Nov. 7, 1889, 652.

Mercury and Zinc Cyanide—Non-existence as a Regular Double Compound.—Prof. W. R. Dunstan communicates a lengthy article, in which he details the experiments made respecting the composition of a double cyanide of zinc and mercury, mentioned by Sir Joseph Lister as of high value as a surgical antiseptic, which, in the form of dressings, leaves little to be desired. It is distinguished from mercuric cyanide in being devoid of irritating properties, while on the other hand it is found to be superior to zinc cyanide in its inhibitory antiseptic power. An intimate mixture of the two cyanides does not possess these advantages, apparently because the mercuric cyanide is readily dissolved from the mixture, even by cold water, and is then free to exert its corrosive action on the tissues. As compared with other antiseptic dressings, the new material appears to owe its superiority in a large measure to the circumstance that being almost insoluble in water, it is not readily washed away from the wound. During the manufacture of this substance Professor Dunstan observed several facts which seemed to throw doubt on the statement that it is constituted of a chemical compound of the two cyanides, and his recorded experiments confirm him in the view that such a compound cannot exist. Nevertheless, under certain conditions, a mixture of the two cyanides is obtained in which mercuric cyanide is contained to the extent of about 15 per cent.; and such being the compound used by Sir Joseph Lister, the author gives the details of its preparation as follows:

Mercuric cyanide finely powdered is completely dissolved in a warm concentrated solution of potassium cyanide* and precipitated, when cold (12°–15° C.), with a cold saturated solution of zinc sulphate.† The ingredients should be used in the proportions indicated by the equations—

$$Hg(CN)_2 + 2KCN = HgK_2(CN)_4;$$
$$HgK_2(CN)_4 + ZnSO_4 = HgZn(CN)_4 + K_2SO_4.$$

The potassium cyanide should contain at least 95 per cent. of KCN, but even then a small quantity of a zinc hydroxy-compound will be formed, but its presence to this small extent does not appear to be deleterious. The precipitate is washed free from mercuric salt with cold water and dried, preferably over caustic soda or on porous tiles. If the substance be dried at 100° C., from 2 to 3 per cent. of the mercuric cyanide will be rendered soluble in cold water. It is impossible to occlude the whole of the mercuric salt, because the presence of water during precipitation cannot be altogether avoided. If, with a view to economy, a smaller quantity of mercuric salt be employed in proportion to the zinc salt, mercuric cyanide is still dissolved and a diminished quantity is found to be occluded. Under the most favorable circumstances about half of the mercuric cyanide is washed away, but the salt may of course be recovered by evaporating the washings. Mercuric sulphate cannot be advantageously substituted for mercuric cyanide, since although it can be dissolved in aqueous potassium cyanide, more water is needed to keep the products in solution, and therefore less mercuric cyanide is occluded.—Pharm. Jour. and Trans., Feb. 15, 1890, 653–658.

Sulphocyanide of Potassium—Rapid Determination of Chlorine Present.—According to C. Mann, if an alkaline sulphocyanide is mixed with a solution of copper sulphate and treated with sulphuretted hydrogen, there falls at first only white copper sulphocyanide, which on prolonged action passes into copper sulphide. If more copper is present than suffices for the formation of copper sulphocyanide, and if the current is interrupted at the moment when the liquid becomes brown, and if a corresponding quantity of fresh solution of copper is added to take up the free sulphuretted hydrogen and precipitate any hydro-sulphocyanic acid which may have become free, the filtrate no longer gives the sulphocyanide reaction. If, therefore, there was in the sulphocyanides used only a very trifling quantity of chlorine or bromine, it can be easily detected by the addition of a little nitric acid and a few drops of dilute silver nitrate. The mixture of copper sulphocyanide and sulphide can be easily filtered, and the filtrate never runs through turbid on washing. In practice, 5 gm. of the sample at most are taken, and require 20 gm. pure copper sulphate, which may be kept ready in solution of the strength 20 : 100 aq. Both salts, each dissolved in 100 c.c. of *cold* water, are poured together, sulphuretted hydrogen is passed in and 8 gm. copper sulphate, 40 c.c. water are added, well stirred, and the precipitate is filtered off. The chlorine in the filtrate is determined in the ordinary way as silver chloride.—Chem. News, April 18, 1890, 192; from Zeitsch. Analyt. Chem., 1889, No. 6, 668–669.

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* In order to prevent the crystallization of the mercury salt from the cold solution, 25 c.c. of water must be used for every 10 grams of mercuric cyanide employed.

† If the solutions are mixed while hot, more mercuric cyanide will be dissolved and less will be occluded in the precipitate.

Sodium Nitroprusside—Reaction with Caustic Alkalies and Alkaline Earths.—H. Brunner has observed that sodium nitroprusside, if mixed with caustic soda or potassa, produces an intense yellow coloration. Baryta or lime-water reacts in the same manner, whilst soluble carbonates and bicarbonates have no effect. Hence it appears that sodium nitroprusside is not merely a reagent for soluble metallic sulphides and sulphhydrates, but also for soluble metallic oxides and hydrates. If an aqueous solution of sodium nitroprusside is mixed with sodium hydrate until an orange color appears and alcohol is then added, after shaking and settling a deep yellow oil is separated out, which, on prolonged standing, solidifies into fine orange-colored crystals. A watery solution of this sodium salt, the composition of which has not yet been determined by the author, gives colored precipitates with metallic salts. The soda salt serves as a reagent for acids, with which its solution gives a green color, which, on exposure to the air, turns violet, and finally gives a green precipitate.—Chem. News, Oct. 4, 1889, 168; from Chem. Ztg.

ALKALIES.

Alkalies—Determination in Waters.—For the purpose of determining alkalies in waters an indirect method is mostly used, which depends on converting the residue of the evaporation of several hundred c.c. into sulphates. In this conversion it is difficult to hit the exact quantity of sulphuric acid to be used, but Fr. Muck overcomes the difficulty as follows: He moistens the residue with alcohol containing 3 drops sulphuric acid to 1 c.c. and burns off the alcohol. If the quantity added is insufficient, the resulting saline mass is dry; if sufficient it is moist, and vapors of sulphuric acid are given off before the alcohol is entirely consumed. Until this takes place the moistening and burning off are repeated, using each time smaller and smaller quantities of sulphuric alcohol. The final ignition and treatment is in the well-known manner.—Chem. News, Jan. 17, 1890, 38; from Ztsch. Anal. Chem., 1889, No. 5, 628.

Potassium Carbonate—Presence of Ammonium Carbonate.—F. H. Alcock calls attention to the occurrence of ammonium carbonate in a commercial sample of potassium carbonate.—Pharm. Jour. and Trans,, June 14, 1890, 1018.

Sodium—Improvements in its Manufacture.—The endeavor to make aluminium cheaply has led in recent years to many efforts to reduce the cost of sodium, 4 parts of which are required to make 1 part of aluminium. Prof. P. Phillips Bedson, in connection with his paper on the manufacture of aluminium from cryolite (see "Aluminium"), gives the following description of the method of Prof. Netts, in which most of the difficulties so far encountered have been overcome. The method depends upon the reduction of caustic soda by charcoal, and the principal improvements consist in the removal of the carbonate of soda as slag, the presence of which would necessitate a much higher temperature and much costlier apparatus than is desirable. This method is made more intelligible by a description of the plant employed. The retorts made of cast-iron are pear-shaped, and about three feet in height; at the bottom is a tubulus closed by a plug, and serving for the withdrawal of the slags. Fitting on to the top of the retort is a lid with three openings; one serves to convey the gases and vapors produced to the condensing apparatus; the second opening is used for the introduction of the charge of the reducing carbon; and the third, which is surrounded by a cup, is closed by a screw-valve, by which the flow of fused caustic soda can be regulated. The retort is supported on brickwork, and is surrounded by a circular furnace, in which coke is used as fuel. The heated gases are led away at the top of the retort, at a point below the lid, into a chamber in which is built an iron box, in which the caustic soda is melted by the heated gases from the furnace. The iron box is provided below with an aperture opening into a channel along which the liquid caustic soda is conducted to the cup on the lid of the retort. The opening in the iron box is also closed by a screw-valve, which further serves to regulate the supply of liquid caustic soda to the retort. Fitting on to the top of this iron box is another, closed by a lid, and provided at one side with a slide, which can completely divide the upper box from the lower one, and thus prevent the solid caustic soda from falling suddenly into the fused mass below. The upper box, having been filled with solid caustic soda, is then closed by the lid, and the slide gradually withdrawn to allow the solid caustic soda to fall into the vessel below, in which it is melted. In this manner a portion of the caustic soda is decomposed and metallic sodium produced; the portion partially converted into carbonate collects at the bottom of the retort, and is drawn off from time to time, forming what is styled a soda slag. The soda slags can either be re-causticized or sold to paper manufacturers and others, and, in fact, find a ready sale. Every twelve hours the process of sodium production is interrupted for a short time for the purpose of re-charging the retort with charcoal. Such a retort will yield 42 kilogrms. of sodium in a day, and will produce 750 kilogrms. of the metal before it is so acted upon as to necessitate a renewal. The following are the amounts of the several materials required for the production of one part by weight of sodium:

10	parts of	caustic soda.
1.2	"	cast-iron for the retorts.
12	"	coke.
1.5	"	charcoal for reduction.

At the same time nine parts of soda slag are produced, consisting chiefly of carbonate of soda and some caustic soda, containing about 60 per cent. Na_2O.—Chem. News, Oct. 25, 1889, 201.

Caustic Soda—Determination along with Carbonate.—Hugo Goebel determines caustic and carbonate of soda in one operation, using two indicators, "phenolphthalein" and "Poirier's Blue, C. L. B.," for this purpose. In the first place, by a preliminary trial it is ascertained how much of volumetric acid is necessary to completely neutralize a weighed quantity of the alkali. For the test itself, an amount of acid a little short of this is put into a flask, together with one drop of phenolphthalein (1 part dissolved in 90 parts of 90 per cent. alcohol). The liquid in the flask should not measure more than 50 c.c. The alkali is now added to the flask, and its complete decomposition accomplished by adding the necessary quantity of volumetric acid from a burette. When the solution has just turned colorless, the amount of acid used corresponds to the quantity of caustic alkali plus one-half of the carbonate present. Next one drop of a solution of the Poirier's Blue (1 in 400 parts of water) is added, and the titration continued until a dark blue tint appears. The acid consumed in the last operation corresponds to *half* of the carbonate present. By deducting the latter from the former, the amount of caustic alkali is found; and by multiplying with 2, the amount of carbonate.—Amer. Drugg., March 1890, 53; from Chem. Ztg.

Sodium Carbonate—Estimation in Presence of Sodium Hydrate.—Dr. H. Goebel recommends a process which depends upon the combined use of phenolphthalein and Blue C. L. B. Poirrier as indicators. The estimation is effected by titrating in the cold 10 c.c. of a solution containing 8–10 gm. of the substance dissolved in one liter, after one drop of phenolphthalein has been added with a standardized dilute hydrochloric acid (about 3 c.c. acid, specific gravity 1.16 in one liter water) until a colorless solution results; then adding one drop of Blue, Poirrier, (1 part in 400 parts water) and continuing the titration until the solution becomes dark blue (color of ammoniated copper solution). The acid added after the blue indicator represents one-half of the carbonate which is present; the total acid added minus that required by the carbonate will give the acid required by the hydrate present. It is stated that the volume of the finished titration should not exceed 50 c.c.—Chemiker Ztg., 1889, 696.

Sodium Carbonate—Direct Production from Chloride by the Aid of Electrolysis.—Marx has shown that alkaline chlorides can be directly converted into chlorine and an alkaline hydrogen carbonate, by passing carbonic anhydride through the solution during electrolysis, metal and liquid diaphragms being employed. W. Hempel, who has been engaged independently in making similar experiments, describes, with the aid of diagrams, an apparatus in which sodium chloride can be directly converted into chlorine and crystalline carbonate. The cathode is a perforated iron disc, the anode a perforated carbon disc, the perforations being about 4 mm. in diameter, and bored in an upward direction to allow the gas to escape freely. A disc of ordinary asbestos-paper, placed immediately between the carbon and iron discs, serves as a diaphragm. The three discs are placed in the centre of a vessel made of porcelain and glass, which is thus divided into two chambers, each of which is provided with a conducting tube, in one case for carbonic anhydride, in the other for chlorine. If sodium chloride is added from time to time through a suitable aperture, and the water which is removed with the crystalline carbonate is replaced, the apparatus can be worked continuously, sodium carbonate and almost chemically pure chlorine being obtained. A tension of 3.2 volts is required for decomposing the sodium chloride, and a tension of 2.5 volts to overcome the polarization current; but the latter has only a slight tension when both electrodes are made of carbon. With a current of 1.73 amperes 0.93 gram of chlorine per hour was produced, so that if a dynamo were employed it should give 64.5 grams of chlorine and 259.8 grams of $Na_2CO_3 + 10H_2O$ per horse-power-hour.—Amer. Jour. Pharm., June 1890, 301–302; from Ber. d. D. Chem. Ges., 1889, 2475–2478, through Jour. Chem. Soc., Jan. 1890, 10.

Solutions of Ammonia—New Determinations of Specific Gravity.—Grüneberg has lately published a new table of the specific gravities of solutions of ammonia, which table appears to agree very closely with that published years ago by Wachsmuth. The tables of both investigators are, however, based on determinations performed at different temperatures, and if the necessary corrections are introduced into Wachsmuth's tables, who took 12° C. as the normal temperature, it will be found that the agreement with Grüneberg, although still good, is no longer very close. Lunge and Wiernik now made a large number of experiments, in which the specific gravities and actual percentages of ammonia in ammoniacal liquors were determined with the greatest possible care. From these determinations a table was calculated, which agrees very well with Wachsmuth's corrected for a temperature of 15° C., whereas Grüneberg's figures are a little too low as will be seen by the comparison of the tables.

Specific Gravity.	Carius 14° C.	Grüneberg 15° C.	Smith 14° C.	Wachsmuth Corrected for 15° C.	Lunge and Wiernik 15° C.
0.880	. . .	35.50	. . .	35.42	35.60
0.885	35.65	33.50	. . .	33.64	33.67
0.895	33.35	31.40	. . .	31.86	31.73
0.890	31.10	29.50	30.4	30.08	30.03
0.900	29.00	27.70	. . .	28.34	28.33
0.905	27.10	26.00	. . .	26.64	26.64
0.910	25.20	24.40	24.4	25.02	24.99
0.915	23.40	22.85	. . .	23.40	23.35
0.920	21.65	21.30	. . .	21.80	21.75
0.925	20.00	19.80	20.3	20.26	20.18
0.930	18.40	18.35	. . .	18.74	18.64
0.935	16.90	16.90	. . .	17.20	17.12
0.940	15.45	15.45	15.6	15.69	15.63
0.945	14.05	14.00	. .	14.22	14.17
0.950	12.65	12.60	12.7	12.80	12.74
0.955	11.25	11.20	. . .	11.35	11.32
0.960	9.90	9.80	9.8	9.98	9.91
0.965	8.55	8.40	. . .	8.62	8.59
0.970	7.25	7.05	7.2	7.27	7.31
0.975	6.00	5.75	. . .	5.97	6.05
0.980	4.75	4.50	4.6	4.71	4.80
0.985	3.55	3.30	. . .	3.48	3.55
0.990	2.35	2.15	2.3	2.26	2.31
0.995	1.08	1.05	. . .	1.17	1.14
1.000	0.00	0.00	. . .	0.00	0.00

Carius' table, which for a long time enjoyed a high reputation for correctness, must now give way to those of his successors, who, although working independently, arrived at very nearly the same results. The authors have compiled an additional table giving the percentages corresponding to each unit of specific gravity from 0.882 to 1.000, which may be consulted in Amer. Jour. Pharm., Oct. 1889, 516–517; from Zeitschr. f. Angew. Chem., 1889, 181–183.

Ammonium Carbonate—Occurrence of Acid Carbonate in the Market, etc.—George M. Beringer finds the statement in the Pharmacopœia, that to neutralize 2.616 grams of carbonate of ammonium 50 c.c. of volumetric solution of oxalic acid should be required, to be correct for the officinal salt. As the further results of his investigation, however, he finds that a very hard, clear salt occurs in commerce which is composed wholly of acid carbonate, and this requires a much smaller quantity of volumetric solution, namely 34.6–35.3 c.c.; while another sample of carbonate of ammonia required 41.0–41.4 c.c. Both of these samples, which were of American manufacture, contained empyreumatic substances, the first named having a particularly strong urine-like odor. Respecting the

Volumetric Estimation of Carbonate of Ammonium, the author observes that this cannot be accomplished by direct titration with the oxalic acid solution, owing to the decomposition of the carbonate on heating to expel the carbonic anhydride liberated. The method used by the author was practically the same as that described by Dr. Squibb (Ephemeris, 698). The sample for examination was obtained by selecting a piece of salt free from the outer white deposit of acid carbonate and making a cleavage through the centre of the piece, so as to obtain a section containing the several layers. This was quickly powdered, and the desired quantity weighed and placed in a beaker with 50 c.c. distilled water, the beaker covered with a watch crystal or plate until the salt is dissolved and then carefully run in 55 or 60 c.c. of the oxalic acid solution, raising the cover sufficiently to admit the end of the pipette. After the effervescence has ceased, warm the solution until the CO_2 is entirely dispelled, and then titrate with volumetric soda solution, previously standardized with the oxalic acid solution, using the same indicator as used in the titration of the ammonium carbonate. By deducting the number of c.c. of soda solution required from the number of c.c. of oxalic solution used, the number of c.c. of oxalic acid solution required by the ammonium carbonate is indicated. As an indicator the author prefers litmus solution, prepared by first extracting the litmus with 80 per cent. alcohol, and then dissolving in water and adding to the filtered solution a few drops of nitric acid, until the bright-blue is changed to a purplish tint.—Amer. Jour. Pharm., Oct. 1889, 500–502.

Ammonium Carbonate—Percentage of Carbon Dioxide.—Chas. C. Abbey has experimented to ascertain whether the percentage of carbon dioxide in commercial ammonium carbonate agrees with the formula given in the U. S. P. The molecular formula of the Pharmacopœia indicates a percentage of 56.05 of CO_2. The pharmacopœial formula $NH_4HCO_3(NH_4)NH_2CO_2$ may be expressed also by $(NH_3)_3(CO_2)_2H_2O$. Another formula used to express the composition of ammonium carbonate would show the salt to have 55.93 per cent. of CO_2. Operating upon different samples, the author obtained varying results. The method followed was to decompose the salt with HCl, drying the gas thus generated with sulphuric acid or calcium chloride, and estimating by absorbing it in a Geisler's potash bulb. Three estimations upon one sample showed it to contain some 56.9 per cent. of CO_2. Seven estimations upon another sample from another store gave from 54.61 to 54.8. Seven estimations upon various samples gave percentages of from 53.14 to 55.01. It will be observed that different samples vary considerably, probably due to the amount of water they contain.—Pharm. Era, Nov. 1889, 417; from Proc. Mich. Pharm. Assoc., 1889.

Ammonium Carbonate—Use for Aborting Coryza.—Ammonium carbonate, given in frequently repeated and rather large doses, is stated by Dr. B. Robinson to be one of the best agents for aborting a coryza.—Amer. Jour. Pharm., April 1890, 173.

Ammonium Chloride—Commercial Quality of the Granular Salt.—Mary H. Spencer has examined commercial samples of granular ammonium chloride. The results are given in a table, from which it will be seen that copper, zinc, iron, empyreumatic substances, sulphate of soda, and sulphate of calcium, were detected in some of the samples. Copper was present in but traces in specimens number three and four; zinc in number eleven in similar quantity; while iron, being present in the form of ferrous chloride, did not detract anything from the white condition of the sample, in contradistinction to the yellow ferric chloride. No traces where found of chloride of sodium, cyanides, sulpho-cyanides, nitrites, lead, or barium. The specimens were procured in Boston, New York, Cincinnati, Columbus and Cleveland.

	Sulphate of Sodium.	Sulphate of Calcium.	Sulphates (in general).	Iron.	Empyreumatic Substances.
1	Trace.	Faint trace.	Trace.	Trace.	Trace.
2	None.	None.	None.	None.	None.
3	“	“	“	“	Trace.
4	Some.	Faint trace.	Some.	“	“
5	None.	None.	None.	Trace.	None.
6	“	“	“	None.	Some.
7	Trace.	Faint trace.	Trace.	Trace.	Trace.
8	None.	“	Faint trace.	“	None.
9	Some.	“	Some.	“	None.
10	None.	None.	None.	None.	“
11	Some.	“	Some.	Some.	Some.
12	“	“	“	None.	None.
13	None.	“	None.	“	“
14	“	“	“	Trace.	Trace.
15	“	“	“	Some.	Some.
16	Trace.	“	Trace.	None.	“

—Amer. Drugg., July 1889, 124; from Proc. Ohio Pharm. Assoc., 1889.

Lithia—Misconceptions About its Solvent Effect upon Uric Acid.—L. Siebold, referring to the great faith shown by some therapeutists in the superior solvent action of lithia upon uric acid, and pointing out that this faith extends not only to the carbonate and citrate, which are capable of acting as antacids, but also to mineral waters containing mere traces of lithium compounds and those in the form of chloride or sulphate, gives the results of a series of experiments made to ascertain how far this faith has a chemical foundation. He found that the solvent action of solutions of lithium, sodium and potassium carbonates on a given weight of uric acid, pure or as deposited from urine, or on a given weight of urinary sediment consisting of acid urates, under exactly similar conditions, is strictly proportional to the ratio of the molecular weights of these solvents. Further, that lithium chloride and lithium sulphate have no solvent action on uric acid and acid urates, and lastly that the degree of alkalinity of urine produced by the internal administration of medicinal doses of lithium citrate is no greater than that produced by equivalent doses of potassium citrate.—Yearbook of Pharmacy, 1889, 412–415.

Lithium Salts—Detection of Sodium in Contamination.—W. H. Symons recommends the following method of detecting the presence of sodium in lithium salts, which is dependent on the very sparing solubility of sodium chloride in hydrochloric acid. If 1 gram of the suspected salt be treated with 10 c.c. of strong hydrochloric acid, the presence of more than 2 or 3 per cent. of sodium carbonate will cause a distinct crystalline precipitate; or if 5 grams of the salt be washed with 20 c.c. of hot water and the filtered solution evaporated to dryness, 2 or 3 c.c. of acid added to the residue will readily detect 0.5 per cent. of this impurity.—Chem. and Drugg., Feb. 1, 1890, 153.

Lithium—Detection and Separation of Sodium.—Isaac W. Thomson has experimented in the same direction and obtained, independently, results that agree well with those of Symons (see above). He states that there is no absolutely accurate process adapted for common application. He had found sodium chloride to be soluble in strong hydrochloric acid to the extent of 1 in 600 only, while lithium chloride was very soluble, and thought that advantage might be taken of this difference in property to separate sodium from lithium salts. As an example, 10 grams of lithium carbonate, containing 2 per cent. of sodium carbonate, was put into a flask with 100 c.c. of water, and the gross weight having been noted, the contents of the flask were brought to the boil, made up to the original weight with water, and 50 c.c. taken out. After filtration, this separated portion was evaporated to dryness, and treated with 15 c.c. of strong hydrochloric acid saturated with sodium chloride, cooled, thrown on a filter, washed with 10 c.c. of the same acid, and finally with pure acid. The residue was dissolved in water, and the solution, evaporated to dryness, gave a residue of sodium chloride weighing 0.11 gram, which was practically equal to 2 per cent. of carbonate. Mr. Thomson made comparative estimations with alcohol and ether, which corroborated the hydrochloric acid result. The presence of sulphate, he ascertained, did not interfere with the method, as it did in the case of the alcohol and ether process.—Chem. and Drugg., Feb. 22, 1890, 248.

Lithium Salts—Estimation of Sodium Salts.—In a second paper, in which the author refers to Isaac W. Thomson's paper, W. H. Symons gives some details of his method for estimating sodium in lithium salts. Strong hydrochloric acid attacks most forms of filter-paper, but paper toughened as recommended by Francis seems quite unaffected. The details of the process are these: A filter-paper is chosen rather smaller than the funnel used, and immersed in nitric acid (sp. gr. 1.42) for a few minutes, and washed with distilled water until the wash-water ceases to have any acid reaction; it is then partially dried by pressing between folds of bibulous paper, and the drying completed in an oven; or the paper may be at once folded, placed in the funnel, and washed with strong hydrochloric acid until all the water is driven out. The lithium salt to be tested is treated with ten times its weight of strong hydrochloric acid (saturated with sodium chloride) in a tall vessel, so that no particles may be carried away. A few minutes are allowed for the reaction to be complete, and the mixed acid liquid poured onto the prepared filter. When all the liquid has drained off, the sides of the vessel are washed with strong, pure hydrochloric acid, which is afterwards transferred to the filter, being distributed as much as possible over the paper. When this has drained, the filter is carefully removed, pressed between folds of dry bibulous paper, and subsequently replaced in the funnel, and again washed with a small quantity of the acid. This operation is repeated three times, the vessel used for solution being washed as well as the paper, and both being kept covered as completely as possible to exclude moisture. In all, 10 c.c. of acid may be used for washing, and an allowance of 0.015 gram sodium chloride made for that dissolved by the acid. The sodium chloride contained in the vessel and the filter is then dissolved in water, that in the funnel being pushed down to the apex of the cone and mixed with the water by means of a loop of platinum wire or a camel-hair pencil. The solution is finally evaporated, and the salt dried at 120° C. and weighed. If the previously obtained acid filtrate is now returned to the filter, so as to drive out the water, the filter will be again ready for use.—Chem. and Drugg., March 1, 1890, 291.

Lithium Salts—Solubility, etc.—F. Kobbe finds that one part of sulphate of lithium, $Li_2SO_4 \cdot H_2O$, is soluble in 8000 parts of alcohol specific gravity 0.812, in 125 parts of alcohol specific gravity 0.885, and in 79 parts of specific gravity 0.902; the presence of sulphuric acid increases the solubility, one part sulphate with an equal weight of concentrated sulphuric acid dissolving in 43 parts of alcohol specific gravity 0.885. *Acid lithium sulphate* cannot be prepared; a mixture of normal sulphate with H_2SO_4, after moderate heating, had a composition approaching that of $LiHSO_4$, but the addition of alcohol decomposed it into Li_2SO_4 and H_2SO_4. The solubility of the sulphate can be used as a test of purity for *carbonate of lithium:* 0.5 gm. carbonate of lithium dissolved in 10 gm. dilute sulphuric acid must remain clear on addition of 20 c.c. alcohol. From 3 to 4 per cent. potassium carbonate and as little as 0.5 per cent. calcium carbonate can be detected by this test; sodium carbonate in quantities to 10 per cent. cannot be detected, but here recourse is had to the flame test, 5 per cent. Na_2CO_3 entirely obscuring the lithium flame. This test is more delicate than the one based on the solubility of the chloride in alcohol.—Pharm. Ztg., 1889, 312.

Lithium Carbonate—Cause of Insolubility.—Complaints having been made that lithium carbonate is not now so soluble in seltzer water as it was formerly, some commercial samples were examined by Carles. They were found to be free from magnesium carbonate, and to contain only 1.25 per cent. of sodium carbonate. Their relative insolubility is attributed by the author to the use of too high a temperature in drying, and to the preparation being sent out in the granular form. It was found that the same samples dissolved much more easily after having been powdered, and that the salt could be rendered immediately and completely soluble in seltzer water by effecting the trituration in the presence of an equal quantity of sodium bicarbonate or sugar.—Pharm. Jour. and Trans., March 29, 1890, 791; from Répertoire, March 10, 1890, 104.

Rubidium-Ammonium Bromide—Medicinal Use.—Professor Laufenauer publishes a preliminary note on rubidium-ammonium bromide. The double bromide was used as being cheaper than the rubidium bromide. It consists of $RbBr_3(NH_4Br)$, representing in 100 parts 36 parts RbBr and 64 NH_4Br. The author has studied its epileptic action in seventeen cases, the doses given varying from 1 drachm to 2 drachms. The effect was similar to that produced by potassium bromide, but more intense. The hypnotic action was very satisfactory. On the whole, it acts very like the other alkaline bromides, but more decidedly. The author reserves to himself the priority of using similar compounds of cæsium.—Chem. and Drugg., Aug. 24, 1889, 263; from Therap. Monatshefte.

ALKALINE EARTHS.

Magnesia—Precipitation.—L. Blum, referring to the recommendation of Mohr to precipitate magnesia with sodium-ammonium phosphate instead of sodium phosphate, because of the greater sensitiveness in the reaction of the former with magnesia, observes that Mohr overlooked a circumstance of great importance in analytical practice, *i. e.*, that the precipitates obtained with the latter phosphate settle with extreme difficulty, whilst in precipitation with sodium phosphate, if the prescribed conditions are observed, the deposition and complete separation of the magnesium precipitate is effected in a few hours, so that Fresenius prescribes only twelve hours' settlement before filtration. In the author's extended experience in the analysis of iron ores and furnace slags, in which the quantity of magnesia never exceeds four per cent., sodium-phosphate is far preferable to sodium-ammonium phosphate. If sodium-ammonium phosphate is used the liquid becomes at once very turbid. The precipitate is of an extremely fine crystalline texture, whereby the settling is uncommonly delayed. In general the supernatant liquid does not become perfectly clear, even in four days. On the other hand, if sodium-phosphate is used for throwing down the magnesia the precipitation is not so rapid, and at the outset not so decided. The precipitate when once formed settles well in a few hours, and the filtration presents no difficulties, while the precipitation is as complete as with sodium-ammonium phosphate, as has been determined by the authors' experiments. For the qualitative detection of magnesia, however, sodium-ammonium phosphate is preferable, of course only in such cases where the detection of alkalies in the same liquid is excluded.—Chem. News, Nov. 15, 1889, 239–240; from Zeitschrift f. Anal. Chemie, Vol. xxviii., Part 4, 452–454.

Magnesium—Value as a Reagent.—H. N. Warren observes that magnesium, both on account of its purity, and, at the same time, the speed with which it facilitates reduction, either in the moist or dry way, causes it to rank high, if not the first, among reducing agents. Thus, for instance, on account of its purity from arsenic, no agent is, perhaps, better suited for the elimination of pure hydrogen when using Marsh's test for that substance. Secondly, its absence from iron renders it one of the safest reagents for the reduction of ferric salts previous to titration. The speed of reduction, at the same time, being about three times that of zinc, and giving practically no reaction with potassic ferricyanide, the desired absence of both phosphorus and sulphur may also be relied upon. The ease with which it precipitates from solutions, for instance, zinc, distinguishes it practically from all other metals, separating the same so perfectly that, if to a solution of zinc acetate containing also metals of the fourth group some pieces of magnesium be introduced, and the solution brought to a state of ebullition, the whole of the zinc is thus separated so as to cause, after the introduction of the necessary reagents to retain in solution the magnesium salts, no precipitate on the addition of ammonium sulphide.—Chem. News, Oct. 18, 1889, 187.

ALUMINIUM.

Aluminium—Manufacture from Cryolite.—Prof. P. Phillips Bedson, after reviewing the different methods that have been in use for the manufacture of aluminium, describes the following, which is now pursued for its manufacture from cryolite: A charge consisting of 200 lbs. of cryolite, mixed with 200 lbs. of salt, is melted in a reverberatory furnace. The fusion of this mixture requires about an hour and a half for its completion; the molten charge is then run into an iron converter which has been previously warmed. A block of sodium weighing about 5 lbs. is next thrown into the molten mass, and immediately submerged by means of a "dipper," worked by two men. The "dipper" consists of a long iron bar, in the middle of which, and at right angles to it, is a second iron rod, to the free end of which is attached a circular piece of sheet iron, slightly concave, and studded throughout with holes. This circular piece of iron fits into the converter, and is worked up and down by a man stationed at each end of the long bar. Immediately on the sodium being brought into contact with the molten cryolite and salt, it is covered by the dipper and slowly depressed through the mass. This operation is repeated until the requisite quantity of sodium has been used, which for such a charge would be some 40 lbs. The introduction of the sodium is attended by a violent reaction, and at the commencement of the "dipping," the temperature rises and a considerable ebullition takes place, accompanied by production of flame and dense white fumes, consisting chiefly of sodium fluoride. As the dipping proceeds, the mass grows darker and the reaction attending the introduction of the sodium less violent. When the required quantity has been introduced, the bulk of the slag is poured off by tilting the converter, which is suspended on trunnions, into a large iron pot, and the last portion, containing the aluminium, is poured into a small iron vessel, in which, on cooling, the aluminium is found collected together in a mass. The separation of the greater bulk of the slags in this way is essential to the successful extraction of the aluminium, since, if the whole mass were allowed to cool, the separated aluminium would gradually dissolve up again in the slags. A notable feature is the short time required to effect this decomposition of the cryolite by sodium, which does not allow of any loss by volatilization of the sodium, nor is there any opportunity for a loss by its combustion, since it is always covered by the molten liquid, and thus protected from the action of the air. Working in this manner, and with a pure cryolite, the aluminium obtained would be practically pure, and from the amount of cryolite mentioned above, the weight of aluminium produced would be about 10 lbs., requiring about 40 lbs. of sodium for its production.

From the above it is evident that the production of aluminium by this method is largely dependent upon the cheapening of the manufacture of sodium, of which metal from 3–4 parts are required for the manufacture of 1 part of aluminium, the theoretical proportion being 2.5 of sodium to 1 of aluminium. Consequently, in recent years many efforts have been made to reduce the cost of sodium production and improve the existing methods. Of all these attempts, the most successful have been those in which caustic soda has been substituted for the carbonate of soda (see "Sodium").—Chem. News, Oct. 25, 1889, 199–201.

Aluminium—Determination of Valence.—Nilson and Petterson, in a paper on the vapor density of aluminium chloride, describe some experiments which support their previous investigation and from which they draw the following conclusions: From the boiling point aluminium chloride is in constant dissociation until above 800° C. the state of a perfect gas is reached, when the vapor density corresponds to the formula $AlCl_3$, which does not change at the highest temperature obtainable. This proves without any doubt that aluminium is a trivalent element.—Amer. Jour. Pharm., Feb. 1890, 94; from Ztschr. f. phys. Chem., 1889, 206.

Aluminium—Action of Sulphuric Acid.—A. Ditte observes that cold dilute sulphuric acid seems to have no action upon aluminium, yet, as the formation of aluminium hydroxide evolves 195.8 calories, this metal should at ordinary temperatures decompose water and *à fortiori* dilute acids. The author's experiments demonstrate that such is the case, and that if a plate of aluminium immersed in dilute sulphuric acid seems not to be attacked, the cause is that it becomes coated with a continuous layer of hydrogen, which prevents all direct contact with the liquid.—Chem. News, April 11, 1890, 178; from Comptes rendus, cx., No. 11.

Aluminium—Action of Nitric Acid.—As is the case with dilute sulphuric acid, A. Ditte finds that with dilute nitric acid metallic aluminium becomes covered with a gaseous stratum which prevents its contact with the acid. If the experiment is prolonged for some days, bubbles of gas are slowly formed upon the metal, which dissolves little by little. In a vacuum the action is more rapid. There is no liberation of hydrogen; in very dilute nitric acid there is given off a mixture of nitrogen and nitric oxide, the former predominating whilst ammonia remains in the liquid. All these reactions are exothermic, and sometimes one of them is produced almost exclusively. In a vacuum the nitric acid is converted into neutral aluminium nitrate; but the reaction does not then stop, as the nitrate, like the sulphate, is attacked by aluminium, and a sub-salt is formed. If aluminium is heated in a solution of its nitrate, bubbles of hydrogen are given off, and if the heating and the concentration of the liquid are kept constant there appears a white granular precipitate of basic nitrate.—Chem. News, May 2, 1890, 216; from Compt. rend., April 14, 1890.

Alumina—Percentage in the Rhizome of Hydrastis canadensis, which see under "Materia Medica."

Alum—Part Played in Bread Making.—Bruylants observes that alum owes its power of blanching the paste of bread not to the alumina which it contains or to the combination of this earth with the gluten, but to the sulphuric acid liberated by the formation of aluminium albuminate. According to Nothnagel and Rossbach, the prolonged daily use of alum in the proportion of 0.05 to 0.1 gm. occasions gastric disturbances not unimportant. The author finds that the artificial gastric digestion of alumed bread effects the solution of all the alum present. Hence it is possible that a quantity of alumina equivalent to 0.20 gm. of alum may enter the circulation daily.—Chem. News, Sept. 13, 1889, 133; from Jour. de Pharm. et de Chim., 1889 (xix.), No. 11.

Sodium Alum—Physical Properties.—According to all authors, sodium alum is exceedingly efflorescent and falls into powder after some days' exposure. Angé, however, finds it to be only slightly efflorescent, and that it can be kept unaltered several months. Wurtz gives its solubility at 16° C. as 110 parts in 100 parts water. The author finds 100 parts of water, at 16° C., to dissolve only 51 parts of the crystallized alum. Its solution may be boiled indefinitely without destroying the power of the alum to crystallize, notwithstanding that Muspratt, Wagner and others state that the crystallizing property is destroyed by simply heating to boiling.—Pham. Jour. and Trans., June 28, 1890, 1059; from Compt. rend., June 2, 1890, 1139.

ZIRCONIUM.

Zirconium—Atomic Weight.—G. H. Bailey communicates the results of investigations undertaken primarily to re-determine the atomic weight of zirconium. He describes in detail the methods employed for preparing crude zirconia, the purification of the base, the preparation from it of the metallic zirconium, the production of the peroxide, tetrachloride, oxychloride, tetrabromide and sulphate, and finally the methods pursued in determining the atomic weight, which were both by the wet way of Berzelius and the dry way of Mats Weibull. The mean results of his determination give the atomic weight of zirconium at 90.401 (H = 1) or 5.664 (O = 1). Berzelius determined 89.23 (H = 1) or 5.591 (O = 1), while Mats Weibull's determinations give 89.255 (H = 1) or 5.592 (O = 1).—Ch. News, July 5, 12 and 19, 1889.

MANGANUM.

Manganese—Preparation and Properties of the Metal.—Chas. Bullock has prepared metallic manganese by the process of Bruner, which consists in the reduction of the chloride mixed with fluor-spar, by means of sodium. Pure chloride of manganese was fused in a clay crucible and poured on a stone slab; when cold it was pulverized and mixed with an equal weight of powdered fluor-spar. This mixture, divided into portions of one ounce, was introduced into a French clay crucible, previously heated to redness. Eighty grains of sodium, cut into small pieces and freed from naphtha, being added to each portion, the crucible was covered, and reaction allowed to take place before adding another charge. After six ounces of the mixture had been added, the contents of the crucible was covered with fused chloride of sodium in powder, the cover replaced, and the heat carried to quiet fusion. After the flux became entirely fluid the heat was continued for ten minutes. The crucible was then removed from the fire, and, after cooling, the metal was found as a button at the bottom. The yield of manganese under favorable circumstances was about 20 per cent. of the chloride used. Reduction was also tried by using fused chloride of sodium without fluor-spar; the yield of metal was much less, and differing in some of its properties from that obtained with the use of fluor-spar. Manganate of soda was formed when sodium chloride alone was used as a flux. Manganese thus obtained is very brittle, with a steel-white fracture, so hard hat a file will scarcely touch it; the edges of the fracture scratch and almost cut glass. The metal retains the brightness of a fractured surface after prolonged exposure to the air, and appears not more disposed to oxidation than iron. It is entirely passive to magnetic attraction. The specific gravity of the metal obtained when fluor-spar was used was 7.072; when remelted under fused sodium chloride the specific gravity rose to 7.153. The metal obtained without the use of fluor-spar was less brittle, and had a different fracture; its specific gravity was 7.231. Authorities differ regarding the specific gravity of manganese, ranging it from 6.85 to 8.013. An examination of the metal obtained, using fluor-spar as a flux, showed the absence of iron and the presence of calcium, demonstrating the reduction of some of the latter metal from the spar. This may account in a measure for the increased specific gravity on remelting under sodium chloride, as also the greater specific gravity of the metal when the spar was not used. As calcium has the specific gravity of 1.57, a small amount alloyed with the manganese would sensibly affect its gravity.—Chem. News, July 12, 1889, 20; from Jour. Frankl. Inst.

Manganese—Preparation of the Metal.—Dr. Glatzel describes a new method for preparing perfectly pure metallic manganese rapidly and in tolerably large quantities, as follows: A quantity of manganous chloride is first dehydrated by ignition in a porcelain dish, and the pulverized anhydrous salt afterward intimately mixed with twice its weight of well-dried potassium chloride. The mixture is then closely packed into a Hessian crucible and fused in a furnace at the lowest possible temperature, not sufficient to volatilize either of the chlorides. A quantity of metallic magnesium is then introduced in small portions at a time, the total quantity necessary being about one-sixth of the weight of the manganous chloride employed. Provided the crucible has not been heated too much above the melting point of the mixture of chlorides, the action is regular, the magnesium dissolving with merely a slight hissing. If, however, the mixture has been heated till vapors have begun to make their appearance, the reaction is extremely violent. It is therefore best to allow the contents, after fusion, to cool down to a low red heat, when the introduction of the magnesium is perfectly safe. When all action has ceased, the contents of the crucible are again heated strongly, and afterward allowed to cool until the furnace has become quite cold. On breaking the crucible, all the potassium chloride and the excess of manganous chloride is found to have been volatilized, leaving a regulus of metallic manganese, fused together into a solid block, about 3 parts by weight being obtained for every two parts of magnesium added. The metal, as thus obtained, is readily broken up, by hammering, into fragments of a whitish-gray color, possessing a bright metallic lustre. The lustre may be preserved for months in stoppered glass vessels, but when exposed to air the fresh surface becomes rapidly brown. The metal is so hard that the best files are incapable of making any impression upon it. It is so feebly magnetic that a powerful horse-shoe magnet capable of readily lifting a kilogramme of iron has no appreciable effect upon the smallest fragment. It was noticed that the introduction of a small quantity of silica rendered the manganese still more brittle, and caused it to present a conchoidal fracture, that of pure manganese being uneven. The specific gravity of the metal, former determinations of which have been very varied, was found to be 7.3921 at 22° C. This number, which was obtained with a very pure preparation, is about the mean of the previous determinations. Dilute mineral acids readily dissolve the pulverized metal, leaving a mere trace of insoluble impurity. It is also satisfactory that practically no magnesium is retained alloyed with the manganese, and the introduction of carbon is altogether avoided by the use of this convenient method.—Amer. Drugg., March 1890, 52; from "Berichte."

Manganese—Source of Error when Estimating in Presence of much Lime.—In precipitating manganese by ammonium sulphide, R. Fresenius proposes to allow in all cases the lapse of at least twenty-four hours, but in very dilute solutions forty-eight hours, before filtering. In the analysis of Luxemburg blast furnace slags, where small quantities of manganese have to be determined in presence of much lime, and in consequence large weights have to be taken for analysis, it has occurred to L. Blum that in allowing the solution, reduced to a small volume, to stand for some time, there was separated out along with the manganese sulphide another crystalline compound, which rendered the results too high. The compound was obtained pure by allowing a concentrated solution of calcium chloride, mixed with yellow ammonium sulphide, to stand for some time, with access of air. The compound separated out in crystals, which adhered firmly to the glass. A qualitative examination showed that it was calcium hyposulphite. In those cases, therefore, where, in consequence of the co-existence of a little manganese and much lime, a strong concentration of the liquid is requisite, it seems not advisable to allow the precipitate to settle too long. It is then better to proceed according to the process given by Finkener, who filters off the precipitate of manganese sulphide at once after a good ebullition and the addition of a further dose of ammonium sulphide. On proceeding in this manner a deposit of calcium hyposulphite has never been observed.—Zeitschrift f. Analyt. Chemie, 1889, Part iv., 454.

FERRUM.

Reduced Iron—Volumetric Examination.—According to A. Partheil, reduced iron may be volumetrically examined by the following method: One gram is placed in a 200 c.c. cylinder or flask, dissolved in 40–50 c.c. dilute sulphuric acid (1 : 5) and potassium permanganate solution added carefully until a permanent red color is produced; by the addition of a dilute sugar solution the excess of permanganate is decomposed and the solution diluted with water to 200 c.c. Of this solution 50 c.c. (=0.25 gm. of reduced iron) are placed in a flask, a solution of two grains of potassium iodide in water and a few c.c. of hydrochloric acid added, and the flask corked; after standing for one hour the liberated iodine is titrated with $\frac{n}{10}$ solution of sodium thiosulphate, adding a little starch solution towards the end of the titration. The number of c.c. thiosulphate required, multiplied by 0.0056, will give the amount of total iron (metallic iron and magnetic oxide of iron). The percentage of metallic iron may be obtained directly by multiplying the c.c. of thiosulphate solution used by 8.12 and subtracting 262.5.—Apoth. Ztg., 1890, 55.

Crystalline Ferrous Hydrate—Production similar to Crystalline Cobaltous Hydrate, which see under "Cobalt."

Ferric Oxide and Alumina—Determination in Presence of Lime and Phosphoric Acid.—G. Kennepohl recommends the following method for the determination of ferric oxide and alumina in the presence of lime and phosphoric acid: The hydrochloric solution, placed in a 100 or 200 c.c. flask, is neutralized with ammonia; to the neutral or slightly ammoniacal solution there is further added, disregarding any precipitation produced by the ammonia, a slight excess of oxalic acid, and the whole is heated for some time to 80°. After the calcium oxalate has fully settled, the flask is cooled, filled up to the mark, filtered through a folded filter, and a measured quantity of the filtrate is evaporated to dryness in a platinum capsule. The dry residue is slightly ignited to destroy the oxalic acid, the residue moistened with strong ammonia, dried in the covered capsule, and finally dissolved in strong hydrochloric acid with the aid of heat. The solution is washed into a flask and the iron-alumina phosphate is precipitated with ammonia and acetic acid and further treated in the usual manner.—Chem. News, Aug. 23, 1889, 98; from Chem. Ztg.

COBALT.

Crystalline Cobaltous Hydrate—Production.—A. de Schulten obtains cobaltous hydrate by heating a solution of 10 gm. cobaltous chloride in 60 c.c. water with 250 gm. caustic potassa, in a flask of Bohemian glass into which is passed a current of coal-gas. As the temperature rises the cobaltous chloride dissolves in the potassa, which turns to a deep blue. The solution is let settle for twenty-four hours, keeping the flask full of coal-gas. Cobaltous hydrate appears to the naked eye as a deep violet powder, which, under the microscope, appears in quadrangular prismatic crystals. Ferrous hydrate is obtained in a corresponding manner, using soda instead of potassa. Nickel hydroxide is perfectly insoluble in the strongest solutions of potassa and soda.—Chem. News, Sept. 13, 1889, 133; from Compt. rend., Aug. 12, 1889.

CHROMIUM.

Chromium Chloride—Convenient Method of Preparation.—A. Vosmaer obtains Cr_2Cl_6 in any desired quantity by passing chlorine gas over heated chrome iron. In a combustion-tube the product can easily be obtained pure, as the ferric chloride is much more volatile and the manganous chloride much less volatile. The author uses a chrome iron containing about 21 per cent. of chromium. Care must be taken that the tube does not become blocked up. The product obtained was quite insoluble in water, and consisted of long beautiful violet needles of a velvet-like lustre.

The author attempted to obtain tungsten hexachloride in a similar manner from tungsten-iron. The result was a mixture of scarlet needles of $WOCl_4$ and of yellow WO_2Cl_2. The former compound passes quickly into the latter.—Chem. News, Aug. 16, 1889, 85; from Ztschr. Analyt. Chem., Part 3, 1889.

Chromium Sesquibromide—Isomeric States.—A. Recoura has previously shown that chromium sesquichloride differs from the other salts of chromium by the fact that it may assume two distinct isomeric states, but presenting this character in common, that the oxide precipitated from both their solutions by alkalies is the sesquichloride of the violet series. He obtained the green sesquibromide by mixing a saturated solution of chromic acid with a solution of hydrobromic acid at about 50 per cent., employing it in large excess. The solution evaporated down with heat, gives, when cold, fine green needles, having the composition $Cr_2Br_3 12HO$. They are extremely soluble in water and very deliquescent. The dilute solution passes in about an hour from a splendid green to a bluish shade, and in twenty-four hours to a violet. This change is accompanied by the liberation of heat. The sesquioxide precipitated from the solutions, whatever their state, is always that of the violet salts of chromium.—Chem. News, June 6, 1890, 277; from Comp. rend., May 19, 1890.

Blue Chromium Sesquibromide—Ready Change to the Green Modification.—In continuation of his researches (see above) A. Recoura notes that the solid blue chromium bromide, if kept for some time at 100°, is transformed into its green isomer without a change of composition. It does not appear to be produced spontaneously at ordinary temperatures. If a solution of the blue bromide is left to crystallize there are formed, at first, long blue crystalline needles; then when the water has almost disappeared we see appear, among these needles, small green crystals which gradually pervade the entire mass. On the other hand, a saturated solution of the green bromide remains green, and in time deposits green crystals. If a solution of the green bromide, mixed with free hydrobromic acid, is let stand, it remains green for an indefinite time, and does not pass into the violet modifications.—Chem. News, June 27, 1890, 314; from Compt. rend., June 9, 1890.

ZINCUM.

Zinc—Separation from Nickel.—H. Alt and J. Schulze find that in a solution of zinc and nickel containing a sufficiency of succinic acid, a current of sulphuretted hydrogen precipitates all the zinc as a perfectly white zinc sulphide, whilst the nickel remains in solution. The liquid may be either hot or cold, and an excess of the precipitant is not objectionable. The succinic solution must be free from salts, as otherwise nickel sulphide may be simultaneously precipitated. The authors give an especial description of the analysis of nickel silver, which see in Chemical News, March 14, 1890, 124; from Ber. d. D. Chem. Ges.

Zinc Dust—Examination.—E. Reichardt having noticed an evident deficiency in the action of zinc dust, subjected the sample to analysis, with the following results: Zinc, 92.92; lead, 2.46; cadmium, 3.10; insoluble in HCl, 0.40; carbonic acid 1.12 per cent. The insoluble portion was composed of sand and combustible matter (probably carbon). The large amount of cadmium is notable.—Arch. d. Pharm., Aug. 1889, 752–753.

Calamine—Variability.—W. Murton Holmes observes that although calamine cannot be said to be in very general demand, it is extensively prescribed by specialists in skin diseases, who seem to prefer it to the pure carbonate of zinc. Whether or not its action is anything more than a mechanical one is hardly a subject for us to discuss. Our province is to endeavor to supply the demands of the medical profession. The author records his researches, and endeavors to determine what calamine should be. He finds that in calamine we have to deal with a very variable substance—one that varies considerably in the same vein of ore—and it would be possible to produce a prepared calamine answering all the Pharmacopœia tests with but a small percentage of zinc in its composition, and containing instead calcium or magnesium. In his opinion the source of calamine should be stated in the Pharmacopœia—a source whence not only a few isolated good pieces of ore can be selected, but one where the whole is of tolerably uniform quality, and the supply abundant. Then again the percentage of zinc should be stated, and there should be something more definite with regard to color than the description "a pale pinkish brown." Perhaps a slip of paper of the required tint of the calamine *when moist* could be inserted. Better still would it be if something of a definite nature could be substituted. Possibly the white variety, which is also the purest, with a definite quantity of coloring matter, would answer the purpose. There is no difficulty in levigating the ore when it can be obtained. The plan is to roast it gently on a gas stove for about a quarter of an hour. This makes it darker in color and at the same time more friable, so that it is easily powdered. He then washes with plenty of water, passes the liquid through lawn, and allows the suspended matter to subside. The supernatant liquid is then poured off, the pasty mass allowed to drain on calico, then pressed and dried. It is finally passed through a sieve to break up any lumps.—Pharm. Jour. and Trans., Dec. 14, 1889, 474–475.

Basic Zinc-Ammonium Carbonate—Formation, Characters and Composition.—Dr. George Kassner draws attention to a peculiar zinc compound which was produced during the passage of a weak electric current through a solution of ammonium carbonate, the anode being a rod of zinc. The new compound, which was subsequently found to be a basic zinc-ammonium carbonate, having a composition corresponding to the formula $Zn_3(NH_4OH)(CO_2)_2 + H_2O$ was deposited at first in the form of transparent crystalline needles, which subsequently became opaque, and finally, when carefully washed, pressed and dried, constituted a white crystalline powder, insoluble in water, but rapidly dissolved by solution of potassa with evolution of ammonia.—Arch. d. Pharm., Aug. 1889, 675–678.

Sulphide of Zinc—Medicinal Use.—Precipitated zinc sulphide has been used both internally and externally, with good results, in chronic eczema and psoriasis. For internal use Barduzzi prescribes: zinc sulphide 0.50, extract of gentian, sufficient to make 50 pills; from 3 to 12 pills are taken daily. Externally it is applied: zinc sulphide 5.0, lanolin 20.0, lard 30.0. —Apoth. Ztg., 1889, 1184.

CADMIUM.

Cadmium Sulphide—Characters when Obtained by the Humid Method. —N. v. Klobukow states that cadmium sulphide obtained in the moist way varies in color from a light yellow to a deep reddish brown. Formerly the differences of color and the modifications in density were ascribed to a difference in chemical composition. It appears, however, from the comprehensive investigations of Follenius and Buchner that in aqueous solutions of cadmium there is formed only one grade of sulphuration, cadmium monosulphide, and that the precipitates of different colors have the same empirical composition. The author concludes that the determination of the specific gravity of the modifications of cadmium sulphide described by Buchner speaks in favor of their isomeric character. Crystallographic examination leads to the same result, and renders it probable that there exist more than two modifications of cadmium sulphide. The mutual transformation of the modifications of cadmium sulphide can be effected not merely by the action of heat and of various chemical agents, but by friction, pressure, and by means of nascent hydrogen.—Chem. News, Aug. 2, 1889, 62; from Jour. prakt. Chem., 1889, parts 8 and 9.

Cadmium and Zinc Chromites—Formation.—G. Viard obtains the chromites of zinc and of cadmium by a modification of Gerber's process. He causes the vapors of the chlorides, carried along by a slow current of nitrogen or carbon dioxide, to act upon neutral potassium chromate. Both the chromate and the chloride are placed in boats in a porcelain tube. The zinc chromite forms black regular octahedral crystals, hard enough to scratch quartz and not attacked by acids. The cadmium compound is formed by a similar process, and yields crystals which scratch glass, but not quartz.—Chem. News, Aug. 9, 1889, 72; from Compt. rend., July 22, 1889.

CUPRUM.

Copper—Delicate Test.—Dr. H. Thoms noticed that potassium iodide was dissolved in a sample of distilled water with a yellow color. Investigating the cause thereof, he found it due to traces of copper which could not be detected by potassium ferro-cyanide. This peculiar behavior is due to the following: As copper does not form a cupric iodide, when a cupric salt and potassium iodide are mixed, the copper is reduced to the cuprous state and iodine is liberated. The latter could still be detected by means of starch solutions when a solution of cupric sulphate 1 to 500,000 was treated as above.—Amer. Jour. Pharm., March 1890, 128; from Pharm. Centralh., 1890, 32.

Copper—Determination by Converting the Sulphide into Oxide.—On working with precipitates of 0.18–0.22 gm., C. Holthof observes that precipitated copper sulphide, filtered in a suction-pump, introduced, while still moist, into the crucible, and treated exactly according to Bunsen's directions, smoulders at a moderate temperature of the crucible, and passes readily into copper oxide, so that, on subsequent ignition over a good burner for seven to ten minutes, there is no further loss of weight on reignition, nor can any trace of sulphuric acid be found in a solution of the residue. Dried precipitates of copper sulphide, even after ignition for hours, still retain traces of sulphuric acid.—Chem. News, April 18, 1890, 193; from Ztschr. Anal. Chem., 1889, No. 6, 680.

Copper—Volumetric Determination.—A. Etard and P. Lebeau observe that in the various volumetric processes for the determination of copper, the end of the reaction is not shown with certainty. They propose the following, which depends upon the deep coloration of cupric bromide in presence of hydrobromic acid. Any salt of copper whatever, in a strong solution, treated with an excess of concentrated hydrobromic acid, takes a violet color like that of permanganate. Such a solution, if mixed with a standard solution of stannous bromide or chloride dissolved in strong hydrobromic acid, scarcely grows paler, and at the end it is abruptly decolorized by a single drop of the stannous liquid. The time during which the stannous liquid is run in must not be too prolonged, as on contact with air the violet color is reproduced. The standard of the stannous solution must be verified from time to time.—Chem. News, March 21, 1890, 137; from Comptes rendus, vol. cx., p. 408.

Copper—Titration with Sodium Carbonate Instead of Ammonia as Neutralizer.—Reginald A. Fessenden has found that when carbonate of sodium is used instead of ammonia to neutralize the solution of copper in nitric acid, the end reaction, when titrating with cyanide solution, is very much more sharp and decided than is the case when ammonia is used, and takes place immediately, so that the tedious waiting at the end of every drop towards the end of the titration is unnecessary. Neither sulphuric nor a mixture of nitric and sulphuric acids has any effect on the result.—Chem. News, April 18, 1890, 183.

Copper—Determination in Pyrites, which see under "Sulphur."

Ammoniacal Copper Sulphate—A New Reagent for Proximate Analysis.—Ch. Er. Guignet finds useful application of ammoniacal copper sulphate in determining certain carbohydrates. The solution of cellulose in ammoniacal copper oxide is precipitated by the addition of a large quantity of water, and gives a very definite compound of cellulose and copper oxide, which does not retain ammonia when it has been well washed. If placed in contact with ammoniacal oxide of copper, starch, in its dry state, absorbs copper oxide very readily, so as completely to decolorize the solution. The action is still more rapid with starch slightly moistened. Starch-paste acts in the same manner, but more slowly. Pure water, and even ammoniacal water, only withdraws infinitesimal quantities of copper oxide from the compound. Under these conditions the starch combined with copper oxide is of a deep sky blue and retains ammonia. But if it is heated to 40° in presence of water it loses this ammonia, and becomes of a light green. At 80° the starch passes into the state of paste, retaining anhydrous copper oxide so intimately mixed that under the microscope each grain appeared covered with a blackish grey coating. By a very prolonged digestion with pure ammonia the starch combined with copper oxide is partially dissolved, the solution containing copper oxide and soluble starch. Inuline behaves in an analogous manner. Ammoniacal copper oxide does not throw down any saccharine matter, because the compounds formed by the sugars with copper oxide are very soluble in ammonia. It is not the same with ammoniacal copper (without excess of ammonia). This compound is readily obtained in the crystalline state by adding to ammonia very gradually copper sulphate pulverized and dried at 100°. The liquid heats strongly; it is raised to a boil for some minutes and let cool. Cane-sugar, milk-sugar (and probably the other isomers) do not precipitate ammoniacal copper sulphate. On the contrary, pure glucose (from honey), galactose, etc., precipitate the same reagent in a few moments. The reagent must not be used very concentrated or in excess, as it dissolves the precipitate. Inverted sugar obtained by the action of very weak sulphuric acid upon cane-sugar does not precipitate ammoniacal copper sulphate. It is the same with pure crystalline levulose derived from inuline. But if we add pure glucose to inverted sugar or to levulose the glucosic compound is deposited in a few hours, which seems to show that inverted sugar is a combination and not a mixture of glucose and levulose. Most bodies contained in the decoctions of vegetable matters do not precipitate ammoniacal copper sulphate. The reagent may, in many cases, be employed in preference to lead acetate, neutral or basic. The vegetable acids, the gums, and the pectic matters, do not precipitate the ammoniacal copper salt.—Chem. News, Oct. 25, 1889, 209; from Compt. rend., Sept. 30, 1889.

Copper Oxybromide—Analogy to Altacamite.—According to Et. Brun, a solution of potassium bromide, saturated in the cold with cuprous bromide, deposits, when left in contact with the air, a precipitate which, after being freed by decantation from the supernatant liquid, and being repeatedly washed with a solution of potassium bromide, appears in the form of small deep-green crystals, insoluble in water, but soluble in dilute acids and in ammonia. At 240° to 250° this compound is entirely destroyed, and the residue, on treatment with water, gives off copper chloride, which dissolves, whilst copper oxide remains as a black powder.—Chem. News, July 26, 1889, 49; from Compt. rend., July 8, 1889.

PLUMBUM.

Litharge—Commercial Quality.—E. Reichardt subjected a sample of litharge, in appearance like the ordinary, but unsuitable for glazing earthenware, to chemical examination, and found it to be composed of plumbic oxide $\overset{I}{79.50}$ ($\overset{II}{80.20}$), barium sulphate $\overset{I}{14.55}$ ($\overset{II}{14.55}$), loss $\overset{I}{5.95}$ ($\overset{II}{5.25}$), in 100 parts. The nitric acid solution contained silica, alumina and ferric oxide. It contained only traces of moisture.—Arch. d. Pharm., Aug. 1889, 753.

Lead Paranitrate—Preparation and Use as a New Reagent for Sugar.—Matthieu Plessy describes a new reagent for cane-sugar, grape-sugar and pyrogallic acid, consisting of a solution of lead paranitrate in an excess of melted ammonium nitrate. It is prepared by melting 54 parts of ammonium nitrate and adding to it 34 parts of lead nitrate and 21 parts of lead hydrate. The reagent melts at about 115° C., and in contact with glucose it gives a cherry-red color, with cane-sugar the color of *café-au-lait;* and with pyrogallic acid a chrome-green color.—Pharm. Jour. and Trans., Dec. 28, 1889. 503; from Monit. Scientif., Dec. 1889, 1446.

TUNGSTEN.

Tungsten—Determination in Richly Tungstiferous Alloys.—Dr. Jos. Preusser recommends the following method for determining tungsten in richly tungstiferous alloys: From 0.5 to 1 gm. of the alloy, broken up in a steel mortar, finely pulverized, and sifted through lawn, is heated in a shallow porcelain capsule on a Bunsen burner, before the blast, or in the muffle, until the color, which is at first greenish-yellow, passes into a completely pure yellow. Over the Bunsen burner, this is generally effected in a few hours. No loss of tungstic acid is occasioned by excessive or prolonged ignition. The mass is then rinsed into a porcelain capsule and evaporated down once with aqua regia. It is then repeatedly evaporated to dryness with hydrochloric acid, and heated on the air bath to 120°. It is then taken up in dilute acid, let stand for some hours, and filtered. The tungstic and silicic acids left on the filter are ignited in a platinum crucible, after incineration of the paper, intimately mixed with 3–4 parts of sodium carbonate, and ignited before the blast for thirty minutes. When cold, the melt is dissolved in hot water, filtered, and any tungstic acid not opened up is again fused with sodium carbonate. The filtrate, containing the tungstic acid as a sodium salt, is mixed with hydrochloric acid, when the tungstic acid separates out almost entirely as a white hydrate, but for its complete separation the filtrate, after the addition of acid, must be evaporated down to dryness. It is then dissolved in water, and, after standing for a few hours, it is filtered by means of the filter-pump, and washed with a dilute solution of ammonium nitrate. The precipitate, along with the paper, is placed in an Erlenmeyer flask. Any hydrate adhering to the porcelain capsule is dissolved off by means of ammonia, and added to the contents of the flask, which are brought into solution as ammonium tungstate by the addition of ammonia and gentle heating on a hot plate. The silicic acid remains practically undissolved. The slight error due to the sparing solubility of silica in ammonia may be disregarded. The solution is freed by filtration from the silica evaporated down in a tared porcelain capsule, and the residue ignited until its weight is constant. If tin is present in the alloy, the method of Donath and Müller is applicable. The metal is roasted, evaporated to dryness with aqua regia, heated to 120°, taken up in dilute acid, and the residue is treated according to the instructions of the authors above-mentioned, with the addition of the method just described for separating tungstic acid from silica.—Chem. News, July 19, 1889, 37; from Ztschr. Anal. Chem., xxxviii., Part 2.

TITANIUM.

Titanium — Characters and Compounds.— An interesting paper on "Titanium and its Compounds" was read by A. J. Simons and A. O. Scrivener before the London School of Pharmacy Students' Association, and has been communicated to Pharm. Jour. and Trans., Dec. 28, 1889, 509–511.

URANIUM.

Uranium—Discovery of a Continuous Vein in Cornwall.—The "Standard" observes that the discovery in Cornwall of a continuous vein of uranium is an event of more importance to the fortunate finders than to the world at large. For, though not without its uses, this once rare metal is not indispensable in the Arts. What might have happened, had it originally been cheap enough for the purposes of the great industries, it is difficult to say. But for a century it has occurred so seldom, and then only in pockets or patches, that the current price has been something like twenty-four hundred pounds per ton. It will be understood, then, that although a good deal cheaper than either gold or silver, uranium is still valuable enough to render the ownership of a "true fissure vein" a position to be regarded with something like envy, even by a reef-miner in Grass Valley, or by the millionaire who measures his wealth by "feet" on the Comstock Lode. In appearance, uranium is of a steel-white color, and hitherto it has been extracted very sparingly from various ores. Of these, the only one which is practically available as a raw material is pitch-blende, the "uranpecherz" of the German miners. This mineral is found, associated with lead and silver ores, in various parts of the world, especially in Bohemia, Saxony, and Hungary, in Connecticut, and in the Tincroft and Tol Carne Mines of Redruth, in Cornwall, where it occurs in the shape of greenish or brown-black masses clustering together like grapes. This pitch-blende is, however, almost invariably associated with a host of sulphides, arsenides, and other foreign metallic compounds, so that its extraction is necessarily a troublesome and expensive process. It is, therefore, curious that just one hundred years after Klaproth succeeded in isolating it under a name suggested by the newly-discovered planet Uranus, a lode of unprecedented promise should have been discovered at the Union Mine, Grampound Road, Cornwall. Here the ore, instead of being scattered in "pockets," fills a vein of more or less uniform breadth throughout the "country rock." How continuous it may be it is impossible to predict. But already the prospects are so good that several tons of ore have been banked, the assays reading as high as 12 per cent. of the pure metal, and, in some specimens, running up to 30 per cent. It is true that in Bohemia very rich samples have been known to yield 80 per cent., but this was in exceptional cases and in minute quantities; and should the new Cornish lode not run out, the fresh supplies may enable metallurgists to follow up some interesting experiments, which have previously been hampered, not so much by the cost as by the comparative scarcity of the metal.—Pharm. Jour. and Trans., Sept. 1889, 222.

GALLIUM.

Gallium—Prevention of Loss in Determination.—Lecoq de Boisbandran calls attention to the volatility of gallium chloride, Ga_2Cl_6, which occurs even in the evaporation of hydrochloric solutions. If sulphuric acid is added to the hydrochloric solutions no loss of gallium occurs, even on heating the residue to dull redness. In evaporating hydrochloric solutions of gallium chloride in quantitative investigations, apparatus must be used which permits of condensation of fumes. The best absorbent is potassa-lye.—Chem. News, May 2, 1890, 216; from Annales de Chemie.

ARSENICUM.

Arsenic—Improvement of Gutzeit's Test.—According to E. Ritsert, an increased delicacy of Gutzeit's test for arsenic (see Proceedings 1889, 567) is obtained through the use of filtering paper moistened with an *ammoniacal solution of silver nitrate;* 0.0005 mgm. As_2O_3 still gives a light brown, while 0.001 mgm. As_2O_3 will cause a decided black stain. By using parchment paper instead of filtering paper metallic mirrors are obtainable. Besides greater delicacy this modification has the advantage that ammoniacal silver nitrate is not so easily decomposed by paper.—Pharm. Ztg., 1889, 368.

Arsenic—Rapid Estimation in Ores.—F. W. Boam recommends the following modification of the "uranium acetate method" for the estimation of arsenic in ores. The method is rapid, accurate and applicable to all ores which are attacked by nitric acid. About 1 to 1.5 grams of the ore, previously dried at 100° and powdered, is taken and boiled to dryness with 20 to 25 c.c. pure strong HNO_3. When cool, about 30 c.c. strong NaHO solution (30 per cent.) are added and boiled for a short time, and the liquid filtered off and diluted to 250 c.c. 25 c.c. of this solution are taken, made acid with a 10 per cent. solution of sodium acetate in 50 per cent. acetic acid, and the mixture boiled. It is then titrated with a quarter-normal solution of uranium acetate (made by dissolving 17.1 gm. uranium acetate in 15 c.c. strong acetic acid, and diluting to 2 litres), 1 c.c. equalling 0.00125 gm. As. A solution of K_4FeCy_6 "spotted out" on a white tile is used as the indicator; a drop of the test solution giving a reddish brown coloration with this when the titration is finished.—Chem. News, May 9, 1890, 219.

Arsenic—Determination in Pyrites, which see under "Sulphur."

Arsenic—Further Observations Confirming its Presence in Glycerin, which see under "Organic Chemistry."

ANTIMONIUM.

Kermes Mineral—Administration.—Corivaud states that some physicians are opposed to the trituration of kermes (oxysulphuret of antimony) to be used in potions, on the ground that the process disengages sulphuretted hydrogen and makes the preparation disagreeable to take. At the same time, not to pulverize the kermes is to invite precipitation. The author gets over the difficulty by performing the pulverizing process in a wedgewood mortar, adding to the kermes five times its weight of gum arabic.—Amer. Jour. Pharm., April 1890, 180; from Répert. de Pharm., Feb. 10, 1890.

HYDRARGYRUM.

Mercury—Determination.—J. Volhard communicates the following method for the determination of mercury: In a solution containing the mercury as a mercuric salt, the acid is almost entirely neutralized with pure sodium carbonate, and the mercury is completely precipitated with ammonium sulphide, avoiding too great excess. It is advantageous to use ammonium sulphide recently prepared with the strongest ammonia. Soda-lye is then added with agitation until the liquid begins to clear; it is then heated to boiling, adding more lye until the sulphide is entirely dissolved and the liquid is quite clear. The caustic soda used should be that prepared from the metal, ascertaining previously the absence of silver. From the alkaline solution the sulphide is precipitated at a boiling heat by ammonium nitrate, keeping up the boiling until the ammonia is nearly expelled, and the precipitate is let settle in heat. It is denser and deposits more rapidly than the precipitate obtained with sulphuretted hydrogen. If the precipitate has to be brought upon a tared filter, it is best first to wash by decantation with boiling water until the washings no longer react with a solution of silver nitrate. If, after the precipitation of the sulphide, it has been boiled so long that it may be possibly contaminated with sulphur, a little sodium sulphite is added, and it is again boiled for a short time.—Chem. News, March 14, 1890, 133; from Liebig's Annalen.

Mercury—Detection in Animal Fluids.—E. Brugnatilis utilizes the power of mercurial vapors to reduce gold for the detection of mercury in animal fluids. 50–100 c.c. of the liquid are acidified with a few drops of hydrochloric acid on the water-bath, along with copper wire or copper powder which has previously been ignited in a current of hydrogen, heated to 50°–60°, and then shaken for five minutes. The copper is washed with water and placed in a glass capsule along with an ignited fragment of porcelain which has been moistened with a drop of a 1 per cent. solution of gold chloride. The capsule is covered with a watch-glass and heated on the water-bath, when red or violet spots with a gold reflection appear on the porcelain.—Chem. News, May 9, 1890, 229; from "Riforme Medica," through Ztschr. Anal. Chem., 1889, No. 6, 752.

Mercury—Sensitive Reagent for its Vapors.—Professor Merget uses as a reagent a saturated aqueous solution of nitrate of mercury treated with liq. ammonia until precipitation ceases. The preparation remains unaltered for several months. With this, a few lines may be traced on a sheet of paper and the excess absorbed with a blotter. One-half the sheet is then exposed to the action of the suspected vapors and is afterward compared with the other half, when the mercurial influence of the vapor is detected. The test is very sensitive.—Amer. Jour. Pharm., Jan. 1890, 19; from Bull. de la Soc. de Phar. de Bordeaux, Sept. 1889.

Mercury—Non-Existence as a Double Cyanide with Zinc, which see under "Cyanogen Compounds."

Mercuric Chloride—Toxicological Determination.—For the toxicological determination of mercuric chloride, Prof. Ludwig recommends that the suspected organs be first boiled for several hours with nitric acid. When the mass is completely reduced to a pulp it is placed in a flask (connected to a refrigerator), filled with hydrochloric acid of mean concentration and heated for three or four hours, taking care to stir well. It is then let cool slightly and the liquid is decomposed by means of a small quantity of potassium chlorate; the mixture is filtered to separate the insoluble precipitate and zinc-powder is added. It is stirred for a minute, let settle, and heated again to 50° or 60°, taking care to stir well in order to obtain a complete settlement of the mercury. After letting settle for a day, a small quantity of zinc-powder is again added and the whole process is repeated. The solution is decanted afresh, the collected precipitates are filtered through a funnel stoppered with asbestos, washed, and dried in a current of air. To separate the mercury from the zinc amalgam the author makes use of a tube bent in U-shape at one end, into which there is introduced first a little asbestos, then a layer of lime, then a layer of copper-oxide, and finally the zinc-amalgam. The curved part of the tube which issues out of the furnace is kept cool by means of water. The lime is first heated to redness, then the copper, and lastly the amalgam. A current of air is continually passed through the tube. The mercury separates in drops in the refrigerated part of the apparatus. In this manner, from 97.5 to 98 per cent. of the mercury is recovered. Mercury is localized in certain special organs, especially the liver, the spleen, and the kidneys.—Chem. News, Sept. 13, 1889, 133; from Jour. de Pharm. et de Chim., 1889, (xix.) No. 11.

Mercurammonium Chlorides—Formation.—G. André contributes the results of some studies made to determine the characters and composition of the mercurammonium chlorides produced under various conditions. By mixing cold solutions of mercuric chloride and of ammonia in molecular proportion, and collecting the precipitate after several hours or days, washing with a small quantity of water, and drying at 110°, it has not exactly the composition of mercurammonium chloride, NH_2HgCl. This result is due to the decomposing action of the water, which at once becomes evident in dilute solutions, and which, as Kane has shown, results ultimately in the formation of Millon's dimercurammonium chloride, $NH_2.Hg.O.HgCl$. If, however, mercuric chloride is added to an excess of ammonia and the precipitate is washed rapidly with a small quantity of water, the compound NH_2HgCl is obtained in a pure condition. The presence of Millon's compound in the precipitates formed in dilute solutions is readily detected by the fact that after these precipitates have been dried at 110°, they evolve water, if heated at a higher temperature.

By treating the precipitated mercurammonium chloride with repeated quantities of solution of ammonia, it is finally converted completely into dimercurammonium chloride, while the latter in its turn is completely converted into mercurammonium chloride by prolonged digestion with solution of chloride of ammonium. The author describes the conditions under which intermediate compounds are produced, and observes in conclusion that in all these reactions, when ammonium chloride is formed mercurammonium chloride is also produced, but if ammonium chloride is not formed the precipitates contain only the compounds NHg_2Cl and $NH_2Hg.O.HgCl$.—Amer. Jour. Pharm., Oct. 1889, 519–521; from Compt. rend., cviii., 233–290, 1108 and 1164, through Jour. Chem. Soc., June and Sept. 1889.

Mercuric Oxychlrides—Number and Composition.—Some thirty years ago Roucher described a number of oxychlorides of mercury, and communicated formulæ for six distinct compounds, asserting at the same time the existence of fifteen different oxychlorides. K. Thümmel now communicates the details and results of experiments made in the same direction, which convince him that only five regular oxychlorides exist, viz:

1. Mercuric oxydichloride = $HgO, 2HgCl_2$.
2. Mercuric monoxychloride = $HgO, HgCl_2$.
3. Mercuric dioxychloride = $2HgO, HgCl_2$.
4. Mercuric trioxychloride = $3HgO, HgCl_2$.
5. Mercuric tetraoxychloride = $4HgO, HgCl_2$.

Of these five oxychlorides, Roucher had given formulas only for three, namely: the oxydichloride (No. 1), the dioxychloride (No. 3), and the tetraoxychloride (No. 4). The others, for which he had given formulas, as well as the larger number for which he claimed existence, are, in the opinion of Mr. Thümmel, either modifications or mixtures of different oxychlorides. The author describes the method of the formation and the characters and properties of the above named oxychlorides, which see in Arch. d. Pharm., July 1889, 589–605.

Commercial Vermilion—Composition.—Otto Herting states that while in England and France vermilion is understood to be an artificially prepared cinnabar (mercuric sulphide), in the United States it is (commercially? Rep.) understood to be an artificial product containing no mercury whatever, and composed simply of minium (red lead), the color of which is intensified by the addition of about 4 per cent. of tribromfluorescin (eosin). In his experience, however, the American product always contains other substances, such as baryta, gypsum, calcium carbonate, lead sulphate, etc., and he gives the following analyses as examples:

1. $BaSO_4$, 40.36 per cent.; Pb_3O_4, 55.88 per cent.; eosin and traces of Fe_2O_3.
2. $BaSO_4$, 4.35 per cent.; $PbSO_4$, 1.58 per cent.; $Pb(OH)_2$, 8.16 per cent.; $PbCO_3$, 7.88 per cent.; Pb_3O_4, 77.64 per cent.; traces of Fe_2O_3.
3. Pb_3O_4, 53:56 per cent.; $Pb(OH)$, 21.42 per cent.; $PbCO_3$, 22.02 per cent.; $PbSO_4$, 2.46 per cent.; traces of Fe_2O_3 and Na_2O.
4. Pb_3O_4, 62.89 per cent.; $PbSO_4$, 3.10 per cent.; $PbCO_3$, 27.36 per cent.; $Pb(OH)_2$, 6.42 per cent.; and traces of Fe_2O_3.

—Pharm. Rundschau, May 1890, 110.

ARGENTUM.

Silver—Allotropic Modification.—M. Carey Lea has published the results of experiments in a hitherto unworked and unsuspected field, viz., *the production of allotropic forms of metals.* Allotropic forms of the so-called metalloids—sulphur, phosphorus, carbon, etc—have long been known, but hitherto it has never been demonstrated, and probably not even suspected, that the metals may likewise exist in allotropic forms. The author gives the details of his experiments upon silver, and classifies the allotropic forms of this metal as follows:

A. Soluble, deep red in solution, mat lilac, blue, or green whilst moist, brilliant bluish green metallic when dry.

B. Insoluble, derived from A, dark reddish brown whilst moist, when dry somewhat resembling A.

C. Gold silver, dark bronze whilst wet, when dry exactly resembles metallic gold in burnished lumps. Of this form there is a variety which is copper-colored. Insoluble in water, appears to have no corresponding soluble form.

All these forms, if taken in a pasty condition and spread evenly over paper with a fine brush, take on spontaneously in drying a lustre as high as that of metallic leaf. C when so treated would be taken for gold leaf. But this property is much better seen by brushing the pasty substance over glass. When dry an absolutely perfect mirror is obtained. The particles next the glass, seen through the glass, are as perfectly continuous as those of a mercurial amalgam, and the mirror is as good. A and B form bluish-green mirrors, C gold or copper-colored mirrors. All these allotropic forms of silver are easily reduced to an impalpable powder. One is surprised to see what is apparently solid burnished metal break easily to pieces, and by moderate trituration yield to a fine powder. Whether metallic silver shall be reduced from its compounds in its normal or in an allotropic form, depends upon the reducing agent applied, so that it cannot be said with any certainty whether it exists in its compounds in its ordinary normal form, or in an allotropic condition; the latter alternative seems at least equally probable.—New Idea, Sept. 1889, 66; from Amer. Journ. Science, June, 1889.

Silver—Easy Method of Determination in Presence of Lead.—When a mineral which contains both silver and lead is heated in the ordinary course of blowpipe analysis, on charcoal with fusion mixture—($K_2CO_3 + Na_2CO_3$),—in the reducing flame, it yields, as is well known, a malleable metallic bead which is an alloy of silver and lead. According to Alexander Johnstone, the silver is readily detected in this alloy by dissolving it in moderately strong nitric acid by the aid of heat, neutralizing the solution with sodium carbonate, and then immersing in the fluid two strips—one of bright copper, and the other of zinc. The lead of the solution becomes deposited upon the zinc, while the silver deposits upon the copper foil, and both may readily be subjected to further tests.—Chem. News, Dec. 2, 1889, 309.

Silver—Displacement by Palladium and Platinum.—Frank P. Perkins has observed that it is sufficient to add to a slightly acidulated solution of platinic chloride a fragment of sodium sulphite, and then brush the liquid over a well-washed silver print produced on plain salted paper, for the silver to be almost immediately displaced by platinum. This is a simple method of "toning" for such as have not the ready formed platinous salt at hand. He has also noticed that a slightly acidulated solution of palladous chloride may be used in the same way, and with similar results.—Chem. News, Feb. 21, 1890, 87.

THALLIUM.

Thallium—Volumetric Determination.—Dr. W. Feit observes that thallium is generally determined by precipitation as thallous iodide, which is then dried at 110° to 120° on a weighed filter and weighed. The results agree well together, but they are rather too low, as the iodide is not absolutely insoluble, even in acetic or ammoniacal water. The author proposes a method founded on the reaction of the salts of thallium oxide with potassium iodide. If the solution of a thallic salt is mixed with potassium iodide there is a greenish black precipitate consisting of a mixture of thallous iodide and free iodine. The liberated iodine is converted into hydrogen iodide by an excess of arsenious acid, and the excess is titrated back with iodine solution. For the execution of the analysis the author uses a solution of arsenious acid approximately decinormal and an approximately 1–50th normal solution of iodine accurately standardized with this solution, explicit directions being given for standardizing these solutions, as well as for carrying out the process. The method is, of course, not applicable if metals are present which react with arsenious acid, either becoming reduced or forming insoluble arsenites. Such metals may be previously removed by means of sodium hydrocarbonate.—Chem. News, Aug. 16, 1889, 86; from Ztschr. Analyt. Chem., Part 3, 1889.

Thallium Oxide—Formation of a Crystalline Hydrate.—Douglass Carnegie finds that if thallic sesquioxide is dropped into melting potash, a small quantity dissolves, and a clear yellow fuse is formed. If the heating of this yellow fuse is long continued, beautiful crystalline plates separate. After cooling, the fuse is extracted with water and the crystals washed repeatedly by decantation, first with boiling water till free from adhering potash, and finally with alcohol. The crystals, dried at 100°, give off a mere trace of chlorine when distilled with HClAq, and contain 80.38 per cent. of thallium. This substance is evidently $Tl(OH)_3$ or $Tl_2O_3.3H_2O$, which requires 80 per cent. thallium. It is extremely light, and forms a brown glistening mass composed of microscopic and exceedingly regular hexagonal plates, transmitting yellow light. It is easily soluble in dilute HClAq and H_2SO_4Aq, but generally slight reduction to thallous salt occurs during solution. It is an exceedingly stable hydrate, and is unaffected by exposure to a temperature of 340° C.—Chem. News, Sept. 6, 1889, 113.

PLATINUM.

Platinates—Formation at High Temperatures.—G. Rousseau notes the formation of crystalline platinates of the alkalies and alkaline earths. He had observed the rapid corrosion of platinum crucibles by basic fluxes. The products obtained were often mixed with metallic platinum; sometimes, also, when the fluxes were very alkaline, the crystals collected contained considerable quantities of platinic oxide united to cobalt, iron, and aluminium oxides. This unexpected formation of alkaline and alkaline-earthy platinates was observed between 800° and 1300°. The author has studied the barium and sodium platinates, which represent two very distinct types. In stability the platinates are comparable to the manganites and the ferrites. They present a new instance of the formation of a compound at temperatures higher than the point of their decomposition.—Chem. News, Aug. 9, 1889, 72; from Compt. rend., July 22, 1889.

IRIDIUM.

Iridium—Specific Gravity and Atomic Weight.—According to A. Joly the physical properties of iridium, as prepared in a state of purity by Mr. Matthey upon the principles ascertained by Sainte Claire Deville and Debray differ from those formerly supposed. Its specific gravity is found to be not 21.5, but 22.38. The atomic weight, calculated from the mean result of the author's experiments, is Ir=192.75, which differs little from the mean found by M. Seubert, Ir=192.744.—Chem. News, June 20, 1890, 301; from Compt. rend., June 2, 1890.

Iridium Dioxide—Preparation.—G. Geisenheimer prepares the hydrated dioxide of iridium by heating 3 gm. of iridium to redness for two or three hours in a golden crucible with 10 gm. caustic soda and 3 gm. sodium nitrate. The mass, when cold, is taken up with boiling water.—Chem. News, May 9, 1890, 228; from Compt. rend., April 21, 1890.

NEW ELEMENTARY BODY.

Damarium—A New Gaseous Elementary Body.—In the Chemiker Zeitung (April 2, 1890, 435) an account is given of the discovery in Damara Land of a new gasiform element to which the name "damarium" has been given. The gas is said to be evolved from some funnel-like depressions in an elevated plateau, to which the attention of an exploring party was directed by the remarkable appearance of the surrounding soil. In the immediate neighborhood of the fumaroles the color of the soil was greenish grey, whilst further off it showed the red of ferric oxide. No vegetation existed near, but on the edges and sides of the depressions were a number of bodies of small animals, and especially of insects, the colors of which had undergone alteration. Some of the gas was filled into bottles and sent to Dr. P. Antsch, of Cape Town, who came to the conclusion that it contains a new elementary gaseous substance, half the weight of hydrogen, and possessing enormous reducing powers. He states that on passing some of it through water there was an immediate evolution of hydrogen and a formation on the surface of the water of a colorless, odorless, neutral, mobile, strongly refracting liquid, which he considers to be an oxide of the new element. Upon adding a granule of zinc to this liquid a colorless gas was given off energetically, having a faint musk-like odor, burning with a pale greenish flame and forming an explosive mixture with oxygen. Upon submitting some of the liquid to electrolysis pure oxygen was given off at the positive pole amounting in volume to one-fourth of that of a gas given off at the negative pole, the specific gravity of which is stated as 0.5 (H=1). Dr. Antsch therefore thinks he is justified in representing this oxide by the formula D_4O. As instances of the remarkable reducing powers of "damarium" Dr. Antsch says that it immediately liberates metal from solutions of salts of platinum, gold, silver, lead, and copper; separates sulphur from aqueous solution of sulphurous oxide, and sulphuretted hydrogen from dilute sulphuric acid; reduces ferric salts immediately to the ferrous condition, and separates calomel from solution of sublimate; decolorizes indigo blue and converts nitrobenzol into aniline.—Pharm. Jour. and Trans., May 3, 1890, 893.

This announcement had been made in the Chemiker Zeitung as an April hoax.

ORGANIC CHEMISTRY.

HYDROCARBONS.

(*Including Volatile Oils.*)

Benzin—Purification.—George M. Beringer has found the following process, based upon the surmise that the sulphur compounds are readily oxidized by potassium permanganate, to answer admirably for the rapid purification of commercial benzin:

Take of

Potassium permanganate	1 oz. avoir.
Sulphuric acid	½ pint.
Water	3½ pints.

Mix the acid and water, and when the mixture has become cold, pour it into a two-gallon bottle. Add the permanganate and agitate until it is dissolved. Then add

Benzin	1 gallon.

and thoroughly agitate. Allow the liquid to remain in contact for 24 hours, frequently agitating the mixture. Separate the benzin and wash in a similar bottle with a mixture of

Potassium permanganate	¼ oz. avoir.
Soda	½ oz. avoir.
Water	2 pints.

Agitate the mixture frequently during several hours. Then separate the benzin and wash it thoroughly with water.

The quantity of permanganate necessary is in direct proportion to the impurities existing in the benzin. The quantity ordered in the formula is sufficient for a pretty foul benzin and may be reduced with a purer distillate. The period of treatment can doubtless also be shortened, particularly with appliances suitable to the manufacturer's scale. For the preparation of

Petroleum Ether, for plant analysis, etc., where an exceptionally fine article is desired, it is only necessary to rectify the purified article by fractional distillation from lard or other fatty substance, as recommended by Dragendorff, collecting only that portion which distils below 45° C.—Amer. Jour. Phar., Jan. 1890, 6–8.

Petroleum ether—Application for the Detection of Adulterants in Castor Oil, which see under "Fixed Oils."

Benzoyl Chloride—Preparation.—F. C. Witte gives the following directions for making benzoyl chloride by Bechamp's method, which depends upon the action of phosphorus trichloride—in place of phosphorus pentachloride formerly used—upon benzoic acid. The benzoic acid (100 parts) is mixed with PCl_3 (56.4, or better 60 parts) in a retort, which is connected with a long and ascendant (reversed) Liebig's condenser, and it is carefully heated on an oil-bath to a temperature not exceeding 120° C. for three to four hours, until the development of HCl has ceased. The retort now contains two strata, the one a colored solid and the other a colorless liquid. The latter being subjected to distillation, the portion passing between 195° and 200° C. is quite pure benzoyl chloride. In this way the author obtained from 100 parts of benzoic acid 92 parts of pure C_6H_5COCl.—Pharm. Rec., Nov. 18, 1889, 346.

Nitrobenzol—Detection.—According to J. Morpurgo the detection of nitrobenzol (oil of mirbane) in oil of bitter almonds succeeds easily by warming the suspected oil with black oxide of manganese and sulphuric acid. Nitrobenzol does not lose its odor by this treatment, on the contrary ; the odor becomes more pronounced ; after standing for awhile an odor of oil of cinnamon is developed ; oil of bitter almonds at first develops a disagreeable odor, which after some time entirely disappears. To detect nitrobenzol in soaps, solutions, etc., soaps are first dissolved in water ; the solutions are treated with an excess of slaked lime, extracted with ether, the ethereal solution evaporated to dryness on a water-bath, and the residue shaken up with a little water. In a small porcelain capsule are placed two drops liquefied carbolic acid (made by adding 10 parts water to 100 parts of the crystallized acid), three drops distilled water, and a piece of potassium hydrate of the size of a pea. This mixture is heated to the boiling point, care being taken to prevent charring of the mass, and a few drops of the ethereal residue mixture added ; on continued boiling a carmine-red ring is formed around the edge of the liquid, the depth of color depending upon the quantity of nitrobenzol present ; the addition of calcium hypochlorite solution changes the red into a beautiful green color.—Pharm. Post, 1890, 258.

Artificial Musk—Characters, etc.—The "Chem. and Drugg.," describes "synthetic musk" and discusses its availability as a substitute for true musk. The new product appears in minute, glistening white crystals. Its odor (which the inventors claim to surpass that of true musk in intensity several times) is remarkably powerful and durable, but it is not exactly that of true Tonquin musk—certainly no perfumer would confound the two. When smelled faintly, however, it is of a character decidedly akin to musk, and to the general public the two would probably be the same. It is scarcely necessary to say that the new product is a coal-tar derivative, obtained from toluol as the starting point, though by what precise process is, of course, only known to the manufacturers. It seems probable that the article is a member of the class of aromatic bodies of which vanillin and saccharin are typical samples. The sample tested dissolved readily in rectified spirit. A 1 per cent. alcoholic solution is not in itself of a musky odor, but upon diluting this solution with water the musk odor develops strongly, and remains distinctly perceptible up to 1 in 50,000. Solutions ranging in strength from 1 in 100,000 up to 1 in 720,000 still have a perceptible odor; but in these weak solutions it is not possible to say for certain that the odor is that of musk. The 1 per cent. alcoholic solution diluted with water to 1 in 2,000 is opalescent, but when further diluted to 1 in 36,000 it gradually becomes clear, and the musky odor appears to gain in intensity up to this point.

Upon diluting a 1 per cent. alcoholic solution with water to 1 in 3,000, and adding caustic soda to four times the weight of the "musk," the appearance of the solution remained unchanged, *i. e.*, opalescent. But after boiling the opalescence disappeared, and, in contrast with the non-alkaline solution, the musk odor became much more intense, and appeared to gain in the course of thirty-six hours. Similar treatment with sulphuric acid resulted in the precipitation of the "musk" in the form of needle-shaped crystals, about one-eighth inch long. This solution possessed only a very feeble musk odor, due, no doubt, to the fact that the odoriferous body had crystallized out. The alcoholic solution was neutral to test paper. A drop of it placed on blue litmus paper left no stain when the alcohol was dispelled by heat, but upon exposure to the air for a few hours a faint red spot appeared. It is probable that the body is of the nature of an acid, but although our observations point to this conclusion, they are not sufficiently definite. Mixed with a solution of attar of rose in the proportion of 10 of attar and 1 of musk, and diluted with water, the rose odor predominated at first, but when more water was added the musk began to develop distinctly.

The behavior of the new product with caustic soda would seem to indicate that it could be used as an ingredient in the manufacture of toilet soaps without destruction of the odor of the alkali. Of course, the crowning test of the value of the article can only be obtained by time, and as the musk has only been obtainable for a few weeks, the wholesale druggists and perfumers who are now experimenting with it cannot yet give a definite opinion as to its merits.—Amer. Drugg., April 1890, 73.

Naphthalene—Advantageous Use in Typhoid Fever.— Dr. Tichborne suggests that the powerfully antiseptic and germicide properties of naphthalene might be utilized in the treatment of typhoid fever. He has found that one crystal of this compound placed in three or four ounces of urine will delay the conversion of urea into ammonium carbonate for days, and even weeks, although it is not more soluble than camphor in water. Its relative insolubility in most solvents would, he thinks, be an advantage in typhoid, as the naphthalene would pass through the bowels undigested. The proper dose would have to be settled by experiment, but Dr. Tichborne states that he has himself taken two-grain doses every hour without any other observable result than the deodorization of all fecal matter. For this purpose he points out that the hard crystalline form in which naphthalene is usually met with would be advantageously replaced by a fine precipitate that can readily be obtained by pouring a solution of the compound in strong alcohol or glacial acetic acid into cold water while stirring, collecting and washing the precipitate and drying with a gentle heat.—Pharm. Jour. and Trans., Dec. 28, 1889, 501; from Med. Press and Circ., Dec. 11, 1889, 603.

Naphthalin—Use instead of Camphor against Moths.—The "Pharm. Rundschau" (May 1890), in view of the extended use of camphor in the manufacture of "celluloid," and more recently in the manufacture of "smokeless powder," and the consequent steady increase in its commercial value, calls attention to the superior value of naphthalin as a moth-destroyer. Its penetrant, and to some persons disagreeable, odor is dissipated by airing the goods that have been exposed to it quite as readily as the odor of camphor, and it is to the interest of the pharmacist and druggist, as well as to that of the consumer, that attention should be generally invited to this fact, so that the now expensive camphor may be substituted by the cheap naphthalin.

Naphthalin-Camphor—A New Form of Disinfectant.—L. Keutmann recommends naphthalin-camphor packages in place of naphthalin paper. They are made by melting together four parts naphthalin and one part camphor and pouring into paste-board or metal boxes, and are used by fastening them to the upper part of a wardrobe or trunk, and the evaporation of the mixture can be regulated by opening the lid of the box. The camphor very nicely conceals the odor of the naphthalin. In the same way a disinfectant may be made and used, but substituting carbolic acid for the camphor; in this case it is best to impart a red color by the addition of a little alkali.—Amer. Jour. Pharm., March 1890, 129; from Pharm. Centralh., 1890, 17.

Naphthols—Solubilities and Reactions.—The naphthols are very soluble in alcohol, ether, chloroform and the alkalies, soluble in glycerin, and sparingly soluble (20 cgm. to 1.000 gm.) in water; alcoholized water dissolves them fairly well for practical purposes. Verhassel presents the following list of reactions obtained directly, without previous solution:

	ALPHA NAPHTHOL.	BETA NAPHTHOL.
Chloride of lime liquor.	Violet coloration.	Yellowish green.
Ferrocyanide of potass.	"	Faint yellow.
Ferricyanide of potass.	Brown.	Greenish yellow.
Ammonia.	Colorless.	Greenish.

When the naphthols are dissolved in alcohol and water, perchloride of iron gives an abundant violet precipitate with alpha naphthol, which becomes white and then disappears. With beta naphthol it gives an emerald green color, and, with an excess of the reagent, a greenish precipitate.—Amer. Jour. Pharm., Dec. 1889, 612–613; from J. de Phar. d'Anvers, Sept.

Naphthol—Proper Solvents for Different Purposes.—A writer in "Rep. de Phar." observes that for concentrated naphthol solutions, or topical mixtures, alcohol is used. For washes or gargles the above may be mixed with honey fully liquefied by heat. These, if the honey is free from water, remain limpid for two or three days. Diluted solutions are not so easily made, for, apart from alcohol, only alkalies or alkaline salts can be used, and these, combining with the naphthol, produce comparatively weak antiseptic solutions. The benzoate of soda is useless here. The alcoholic solution may, for some purposes, be diluted with soap and water; but the best method seems to be to first dissolve the naphthol in camphorated alcohol. Camphor liquefies dry naphthol, and it retains the property to some degree in mixtures of water with camphorated alcohol. But, although naphthol in camphorated alcohol mixes more easily with water than does the pure alcoholic preparation, it does not form, strictly speaking, a solution.—Amer. Jour. Pharm., Aug. 1889, 416.

Naphthol—Exhibition in Solution with Oil of Almonds.—Naphthol is often prescribed in potions which are usually made by dissolving it in twice its weight of ether, alcohol or glycerin, and adding the solution to the potion. According to Mainiel, naphthol dispensed in this way soon precipitates. He proposes that the napthol be dissolved in ten times its weight of the oil of sweet almonds. The solution is easily effected with the aid of gentle heat. Gum, syrup, etc., may be agitated with the oil to make an emulsion, in which the naphthol remains suspended in a condition of perfect division.—Amer. Jour. Pharm., Jan. 1890, 19; from Répert. de Phar., Nov. 10.

Eikonogen—A New Photographic Developer.—Prof. G. D. Liveing draws attention to a new photographic developer, which has been recently placed upon the market under the name "eikonogen." It is the sodium salt of amido-β-naphthol-β-sulphonic acid ($C_{10}H_5.NH_2OH.SO_3H$), an acid which was first described by Prof. Meldola, in 1881. Eikonogen crystallizes well from solution in water, and the crystals contain two molecules of water of crystallization. It dissolves with tolerable facility in hot water, but is only sparingly soluble in cold water, and is insoluble in alcohol. The aqueous solution quickly turns yellow, and gradually brown. An alkaline solution turns brown immediately from absorption of oxygen. To keep the aqueous solution for any time it is necessary to add sodium sulphite. Even with the addition of sodium sulphite, Prof. Liveing has found that it does not remain colorless very long. Respecting its value as a photographic developer, Dr. Andersen claims:

1. That while eikonogen reduces the bromide of silver so far as it has been subject to the action of light, the bromide in dry gelatin plates which has not been exposed to light remains unaffected by it.

2. That concentrated solutions of eikonogen (1 : 20 to 1 : 50) produce even with instantaneously exposed plates minutely detailed negatives.

3. The minuteness of detail produced by eikonogen is supposed to be due to the fine grain of the silver precipitate.

4. The tone of the negatives given by eikonogen is well adapted for printing, and in this respect it excels pyrogallol.

5. The solutions of eikonogen containing sodium sulphite are durable even after the addition of carbonate of soda, and the same solution can be used for several pictures in succession.

6. Eikonogen is not poisonous, which cannot be said of pyrogallol or hydroquinone.—Chem. News, Oct. 4, 1889, 163.

Essential Oils—Notes on Various.—Schimmel and Co's. October (1889) Report contains some interesting facts regarding a large number of essential oils, among which are quite a number of novelties. The list embraces the following oils, to which reference may be had in Pharm. Jour. and Trans., Oct. 5 and 12, 1889, 263–264 and 281–283:

Angelica Root Oil (Japanese.)
Arnica Flowers Oil.
Bay Oil.
Betel Oil.
Cassia Oil.
Citronella Oil.
Clove Oil.
Elemi Oil.
Eucalyptus Oil (E. odorata, E. Globulus, E. amygdalina.)
Fennel Oil (Japanese.)
Kesso Root Oil (Japanese—from *Valeriana officinalis*, L., var. *angustifolia.)*
Kuro-moji Oil (Japanese—from *Lindera sericea, Blume.)*
Olibanum Oil.
Orange Flower Oil.

Rosemary Oil.
Thyme Oil.
Garlic Oil.
Oleum Aristolochiæ Subglaucæ (Spanish).
Oleum Artemisiæ Barellieri (Spanish).
Oleum Artemisiæ Hispanicæ (Spanish).
Oleum Cisti Ladaniferi (Spanish).
Oleum Fœniculi (Spanish).
Oleum Helichrysi Stœchadis (Spanish)
Oleum Juniperi Oxycedri (Spanish).
Oleum Lavendulæ Dentatæ (Spanish).
Oleum Lavendulæ Stœchadis Flor. (Spanish).
Oleum Marrubii Alysson (Spanish).
Oleum Menthæ Aquaticæ (Spanish).
Oleum Rosmarinæ (Spanish).
Oleum Rutæ (Spanish).
Oleum Saturejæ Tymbræ (Spanish).
Oleum Solidaginis (Spanish).
Oleum Teucrii Funkiani (Spanish).
Oleum Thymi Capitati (Spanish).
Andropogon Fragrans Oil.

The oils designated as "Spanish" were received by Messrs. Schimmel and Co. from a newly established manufactory in the province of Granada, in the south of Spain. The information in the text is mainly supplied by the distillers, but is supplemented by remarks from Messrs. Schimmel.

The following oils are mentioned in the April Report (1890), and reference may be had to the description and interesting remarks concerning them in Pharm. Jour. and Trans., April 12 and 19, 1890, 836–837 and 855–856.

Anise Oil and Anethol.
Arnica Root Oil.
Betel Oil.
Carrot Oil.
Cascarilla Oil.
Cassia Oil.
Elemi Oil.
Eucalyptus Oil.
Fennel Oil.
Galanga Oil.
Galbanum Oil.
Pine Oil.
Valerian and Kesso Oil.
Almond Oil, Bitter.
Almond Oil, from Peach Kernels.

Ammoniacum Resin Oil.
Angostura Bark Oil.
Beech-Tar Oil.
Caraway Oil and Carvol.
Cinnamon Leaf Oil, Heavy.
Coumarin.
Eucalyptol (Cineol).
Juniper Berry Oil.
Kuro-Moji Oil.
Levisticum Seed Oil.
Pepper Oil—from Long Pepper.
Pimpinella Oil.
Prunus Virginiana Bark Oil.
Rosemary Oil.
Safrol.
Star Anise Oil.

Essential Oils—Possible Value of the Iodine-Absorption Test.—H. W. Snow, referring to the observation of A. B. Stevens that oil of peppermint absorbs iodine quite freely (see Proceedings 1888, 97) states that he had performed a number of experiments before this paper came under his notice with a view to determining the possible value of Hübl's iodine absorption test for determining the presence of oil of turpentine in other essential oils; the idea having suggested itself on account of the free manner in which turpentine absorbed the halogens under certain conditions. He has since continued his experiments, and now reports his results. Following the process of Hübl as nearly as possible without modification, the author gives the details as applied by him to essential oils. Some comparative experiments running from 3 to 48 hours show that about 40 hours must elapse before the absorption of iodine is complete, and sometimes then it does not seem to be so.

	TIME OF DIGESTION.					
	3 hours.	6 hours.	15 hours.	24 hours.	40 hours.	48 hours.
Oil Peppermint.	21.1	22.8	24.5			
" "	. .	. .	. .	. .	179	179
" "	. .	. .	. .	. .	110	110
" "	. .	. .	. .	. .	120	126!
" Bergamot	. .	. .	300	.	.	345
" Orange Peel, Bitter	. .	. .	321	. .	. .	362
" Turpentine	291	333	345	353	. .	397

The following figures show the results and relate to the number of parts of iodine which 100 parts of the oil will absorb in the time specified:

	TIME OF DIGESTION.		
	6 hours.	15 hours.	40 hours.
Oil Peppermint*	23	24½	
" " (adulterated)	84.7 !	74.1 !	
" " "	88.3 !	73.6 !	
" "	. .	. .	179
" "	. .	. .	109
" "	. .	. .	67
" "	. .	. .	71
" "	. .	. .	106
" "	. .	. .	105
" " Japanese	. .	. .	64
Menthol	none.		
Oil Bergamot	. .	. .	345
" Limes	. .	. .	269
" Lemon	. .	. .	343
" Orange (Bitter)	. .	. .	362
Methyl Salicylate (synthetic oil wintergreen)	. .	3¾	
Oil Sweet Birch (sold as oil wintergreen)	. .	3¼	
" Wintergreen, (true)	. .	1	
" Anise	. .	. .	121
" Coriander	. .	. .	385
" Caraway	. .	. .	233
" Thyme	. .	210 !	183 !
Thymol	. .	201 !	181 !
Oil Lavender	. .	. .	286
" Cloves	. .	. .	467
" Sassafras	. .	. .	166
" Pennyroyal	. .	. .	152
" Camphor	. .	. .	129
Camphor	. .	2¾	
Oil Turpentine, (fresh distilled)	. .	. .	397
" Erigeron	. .	. .	280
" Copaiba	. .	. .	250

* An unusually fine article, purchased four or five years ago

The author's experiments thus far indicate that the iodine absorption of essential oils may yield figures having a considerable value in the determination of the purity of oils, but it is of course not likely that these figures are constants, except perhaps in a few instances, any more than the specific rotatory power, specific gravity, etc., are constant. There are also some anomalies which need clearing up, and it is necessary that maximum, minimum and average equivalents should be determined by making estimates with a number of samples of the same oil and of unquestionable purity.—New Idea, March 1889, 17–18.

Volatile Oils—Examination of Samples of Reliable Quality.—Rowland Williams has examined 60 specimens, representing 26 of the most important volatile oils, purchased from reliable sources, with the view to securing data upon which it might be possible to detect and estimate fraudulent additions. Two specimens, and in some cases several, were examined. In each of these the s. g. at 60° F., potash absorption, iodine absorption, and boiling point were determined. The results are given as follows:

Name of Oil.	Specific gravity at 60° F.	Potash absorbed. Per cent.	Iodine absorbed. Per cent.	Boiling-point in ° F.
Aniseed—				
No. 1	0.976	0.25	274.44	434
No. 2	0.984	0.38	185.92	442
Bergamot—				
No. 1	0.879	11.43	247.90	374
No. 2	0.878	8.78	283.71	370
Cajeput—				
No. 1	0.918	0.35	70.85	490
No. 2	0.889	0.41	151.00	486
Caraway—				
No. 1	0.910	0.53	258.26	379
No. 2	0.913	0.35	263.22	388
Cassia—				
No. 1	1.061	10.17	75.06	490
No. 2	1.051	9.62	71.71	486
Cedar-wood—				
No. 1	0.952	0.92	78.51	518
No. 2	0.963	0.92	74.77	520
Cinnamon—				
No. 1	1.031	5.13	128.14	464
No. 2	1.021	4.91	105.05	466
Citron—				
No. 1	0.855	0.67	359.66	348
No. 2	0.871	1.90	320.04	346
No. 3	0.855	1.31	353.94	348
Citronelle—				
No. 1	0.893	3.35	186.30	416
No. 2	0.897	3.43	191.26	426
Cloves—				
No. 1	1.046	2.48	179.83	476
No. 2	1.041	2.35	155.46	478
Eucalyptus—				
No. 1	0.910	0.52	61.68	348
No. 2	0.910	0.36	106.46	350
No. 3	0.888	0.35	110.65	350
Juniper—				
No. 1	0.872	1.12	273.55	340
No. 2	0.878	0.84	236.09	344
No. 3	0.881	0.70	250.06	360
Lavender, English—				
No. 1	0.883	3.70	230.38	378
No. 2	0.887	3.17	248.59	374
No. 3	0.878	0.52	232.92	378

(Samples Nos. 1 and 2 are from Mitcham, Surrey, and No. 3 from Hitchin, Hertfordshire).

Name of Oil.	Specific gravity at 60° F.	Potash absorbed. Per cent.	Iodine absorbed. Per cent.	Boiling-point in ° F.
Lavender, French—				
No. 1	0.893	4.85	198.65	378
No. 2	0.881	9.20	237.21	376
No. 3	—	4.90	199.18	—
Lavender, "Spike"—				
No. 1	0.873	1.99	287.90	330
No. 2	0.904	0.74	207.01	340
Lemon—				
No. 1	0.856	1.49	322.96	349
No. 2	0.858	1.41	320.16	352
Lemon-grass—				
No. 1	0.897	2.25	223.24	432
No. 2	0.898	2.01	271.52	432
Mace—				
No. 1	0.886	0.85	220.85	346
No. 2	0.900	0.67	224.02	346
Nutmeg—				
No. 1	0.883	0.35	201.93	340
No. 2	0.898	0.19	206.24	342
Orange—				
No. 1	0.849	0.39	347.67	348
No. 2	0.853	0.38	341.75	351
Pennyroyal—				
No. 1	0.925	1.46	85.94	420
No. 2	0.939	4.62	78.58	418
Peppermint, Mitcham—				
No. 1	0.903	1.83	36.85	404
No. 2	0.908	1.97	46.37	407
Peppermint, American—				
No. 1	0.911	4.37	71.70	402
No. 2	0.904	2.71	53.09	400
Peppermint, Japanese—				
No. 1	0.900	2.29	56.06	400
No. 2	0.896	2.22	37.08	398
Rosemary—				
No. 1	0.894	0.78	161.67	335
No. 2	0.912	0.88	142.36	333
Rue—				
No. 1	0.860	0.56	192.02	338
No. 2	0.871	0.29	121.32	384
Sage—				
No. 1	0.961	7.09	49.70	360
No. 2	0.918	1.58	117.14	364
Sassafras—				
No. 1	1.056	0.33	162.68	430
No. 2	1.079	0.28	151.01	448
Thyme (red)—				
No. 1	0.892	1.91	181.48	338
No. 2	0.893	1.09	168.40	356
Verbena—				
No. 1	0.896	1.20	267.83	430
No. 2	0.895	1.37	247.81	430

The determination of the iodine absorption—which is new, at least in so far as it is applied to a large number of essential oils—and of the boiling point, afford valuable data in most cases, whilst the potash absorption test is of value in some. The author expresses the opinion that by the use of his method of examination the purity or otherwise of many essential oils can be determined with certainty.—Chem. News, Oct. 11, 1889, 175–176.

Volatile Oils—Iodine Absorption Test.—Attention having been drawn by R. A. Cripps and by H. W. Snow to the fact that certain volatile oils had already been subjected to the iodine absorption test, and that the results obtained were not identical with those of R. Williams, the latter explains that he had adopted four hours as the period of exposure to the iodine (Hübl's reagent), because this period has been adopted by most chemists in the case of fixed oils and fats. He is still of opinion that four hours is sufficient in most cases, but admits that in some cases eighteen hours, as proposed by Snow, might be employed in addition to the four hours' exposure. He expects to make some experiments in this direction at the first convenient opportunity.—Ibid., Nov. 29, 1889, 261–262.

Volatile Oils—Constituents.—O. Wallach describes the constituents of several volatile oils, as follows:

Oil of Laurel-leaves is lævogyre, and has specific gravity 0.924 at 20° C. Only the fractions boiling below 180° were examined and found to be composed of a little *pinene* with considerable *cineol.* The portion boiling above 180° had a decided odor of *anethol.*

Oil of Laurel-berries.—About 50 per cent. boils below 180°, and consists of a little *pinene* and much *cineol.* The hydrocarbon *laurene* of Brühl was not found, the peculiar reactions of which described by him were due to admixture of cineol.

Oil of Olibanum.—The crude oil is slightly lævogyre; specific gravity 0.872 at 20°. Two fractions were obtained by rectification, both lævogyre: 1. Boiling-point 157–160°, specific gravity 0.870 at 20°; 2. Boiling-point 160–165°, specific gravity 0.860 at 20°. *Pinene* was found and its identity with *olibene* established. By treatment with bromine, a fraction, boiling at 177–179°, gave a considerable quantity of dipentene tetrabromide, proving the presence of *dipentene* in this oil.

Oil of Elemi is dextrogyre, has specific gravity 0.900. The fractions below 175° contain *dextro-phellandrene*, a hydrocarbon also found in the oils of bitter fennel and Phellandrium aquaticum. *Dipentene* is present, and in addition polyterpenes and oxygenated products. In the rectification small crystals were repeatedly observed, which were assumed to be *amyrin.*

Oil of Sage.—Dextrogyre, sp. gr. 0.917 at 20°; the first fractions contain *pinene* and *cineol;* the greater portion boils at 201–204°, is called *salviol*, and will be further studied.

Oil of Mace.—Considerable distils at the temperature of 165°; the distillate has specific gravity 0.854 at 20° and is composed chiefly of *pinene*, although slightly lævogyre. The crude oil, as also the higher boiling fractions, are strongly dextro-rotary, and further investigation will be made to ascertain the nature of the dextro-rotary constituent. Dipentene was observed in the fraction boiling between 175° and 180°.—Apoth. Ztg., 1889, 690; from Liebig's Annalen.

Essential Oils—Solubility in Water by the Intervention of Ammonia Soap.—Bergmann has found, that while mixtures of the fixed alkali soaps with hydrocarbons and essential oils form only emulsions in water, under separation of the respective oils, a mixture of an ammonia soap with an essential oil will form a clear solution in water, especially in the presence of excess of ammonia. Turpentine oil, or some other essential oil, is first mixed with castor oil, or a mixture of it with other fat oil; the mixture is then subjected to the action of concentrated acid, and the product after being washed with solution of salt is saturated with ammonia in excess. Or the fat acids may be first separated by treatment of the fatty oil with concentrated acid, then washed with salt solution, and the essential oil added either before or after saturation with ammonia. The preparation thus obtained is said to form a clear solution, and not only to possess the properties of a soap, but also to exercise in aqueous solution the solvent action of essential oil.—Pharm. Jour. and Trans., Nov. 30, 1889, 423; from Chem. Ztg., Nov. 6, 1889, 1477.

Volatile Oils—Distillation on a Large Scale in Vacuo.—In their April (1890) report, Messrs. Schimmel & Co. mention that they have succeeded in attaining a practical solution of the problem of distilling essential oils on a large scale in a vacuum. It is stated that the first large apparatus of the kind erected in their establishment has been in work for some weeks, and that the results leave no doubt that the influence upon the distillation of essential oils will be great, since the injurious action of heat upon the easily decomposable oils is avoided in proportion to the diminished atmospheric pressure under which they are distilled.—Pharm. Jour. and Trans., April 1890, 836.

Essential Oils.—Use of Pyrrol (which see) as a delicate reagent for such containing derivatives of allylbenzol.

Oil of Turpentine—Tests for the Presence of Petroleum.—F. E. Parkinson has made experiments to throw some light on the recent statement that oil of turpentine is commonly adulterated with certain fractions of petroleum, called variously turpentine substitute, shale naphtha, resin spirit, coal-tar solvent, etc. Taking as a basis the statement of B. Redwood, that the presence of petroleum naphtha can be detected by variation of the flashing point, the author devised a method of his own for examination of suspected turpentine, using the Michigan and New York testers. The sample under examination had a flashing point of 91.8° F. Five mixtures were made containing varying proportions of benzine and turpentine, the results being as follows:

No.	Per Cent. Benzine in Mixture.	Flash. Point, ° F.
a.	1	84.8
b.	2	81.3
c.	3	78.3
d.	5	76.0
e.	7	72.0

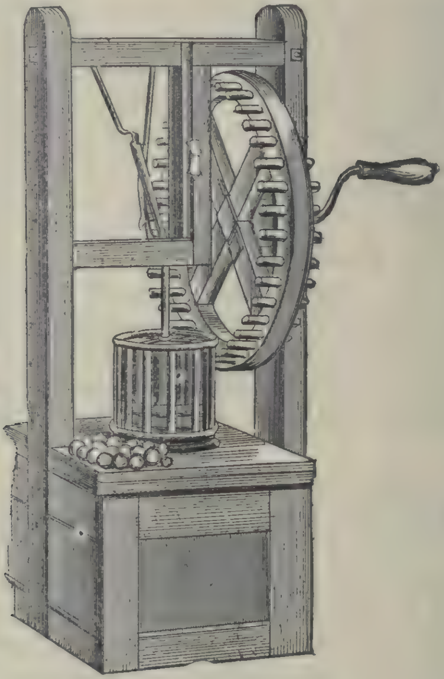
These experiments show a variation of about 2.83° F. for pure oil adulterated with benzine, which variation is sufficient to guarantee a good test for oil of turpentine adulterated with petroleum naphtha.

Experiments were next made with aniline dyes and the alkaloids quinine, morphine and strychnine, and the chemicals antipyrin, antifebrin, and sulfonal, by using an alcoholic solution of the dye with *(a)* turpentine *(b)* turpentine 85 parts and benzine 15 parts, and *(c)* benzine. The dye solutions were made by dissolving 0.5 gm. dye in 1 c.c. dilute alcohol. Three or four drops of the solution were added to the suspected liquid in which the alkaloid or chemical had previously been dissolved. Purely negative results were obtained. Operating with dye solutions alone on solutions *a*, *b* and *c*, many brilliant color changes were obtained, but no results sufficiently distinctive to afford reliable tests for purity of oil of turpentine.—Pharm. Era, Nov. 1889, 416; from Proc. Mich. Pharm. Assoc, 1889.

Oil of Cedar—Production in Florida.—According to a note in the "Garden and Forest," the distillation of oil of cedar *(Juniperus virginiana)*, which has long been carried on in the pencil mills at Cedar Keys, in Florida, from sawdust and wood of inferior quality unsuitable for pencil-making, is likely to be carried on in other States, since straight-grained timber suitable for pencil-making has become scarce in Florida and along the streams of the west coast, where the best used to be found. The supply of cedar timber of suitable quality is said not to be large in proportion to the demand, and not likely to hold out many years longer.—Pharm. Jour. and Trans., Sept. 28, 1889, 244.

Oils of Lemon, Orange, Bergamot, etc.—Machine for their Extraction.—C. Rizzuto, a large manufacturer of the oils of various peels, such as lemon, orange and bergamot, has given to a correspondent of the "Chem. and Drugg." (Aug. 24, 1889, 269–270) some interesting information respecting the extraction of these oils. While the finest products are still made by the old-fashioned sponge method, for ordinary purposes the essences are pressed out of the peel by means of a machine shown in the accompanying cut (Figure 41), which, though in use in Italy for the past four years, is now described for the first time. This machine is entirely constructed of wood, saving the handle which turns the wheel. Contact with metal seriously affects the quality of the essence. The machine stands about 4 feet in height, and its structure is simple and clearly shown in the engraving. The whole fruits are placed under the central circular portion, where the lower and upper surfaces are corrugated so as to press the peel unequally, in order to break the oil sacs. The expressed essence is collected in a vessel below, and after settling for some time it is filtered through felt bags. Essences prepared by this method are what are known in commerce as the finest, those made by the sponge process being scarcely regarded as "commercial," their high price necessarily confining their use to those who specially order them. But it is, of course, possible to have different qualities of the machine-made essences, as quality greatly depends upon the condition of the fruit.

FIG. 41.



Oil of Lemon. Grating Machine.

Some interesting information respecting the process of distillation of the oils, which is ordinarily employed for spoilt fruits, is also given. Also the proper characters of the oils and the extent of their adulteration, are discussed in this paper.

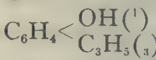
Oil of Lavender—Cultivation of Lavender and Distillation of Oil in Sussex. See *Lavender*, under "Materia Medica."

Oil of Rosemary—Production in England from Plants Grown in Sussex. —E. M. Holmes calls attention to oil of rosemary produced from plants grown by a Mr. Sawer in Sussex. He states that he first experimented with plants raised from seeds which had been collected probably in the south of France, but these yielded a rank oil. He then obtained cuttings from old gardens in England, and found that if planted in August, they strike rapidly, especially if pulled off with a "heel" or woody portion, and shaded from the sun. These plants appear to yield a satisfactory oil. Mr. Sawer recognizes two distinct forms of rosemary, the one having a larger leaf, which is more hoary underneath than the other; both, however, seem equally fragrant, and he mixes them in equal proportions for distillation. Mr. Sawer describes the mode of cultivation and distillation, for which reference must be had to the original paper in Pharm. Jour. and Trans., Jan. 25, 1890, 581.

Oil of Rosemary—Adulteration with Petroleum and with Alcohol.—R. A. Cripps examined four samples of oil of rosemary, and found two adulterated with petroleum and two with alcohol. The adulteration in the first two oils was found by heating on a water-bath until the odor had completely disappeared. The solubility of the oils in alcohol of 0.838 specific gravity was 1 in 20 resp. 30 parts, pure oil dissolving in 5 pts. of alcohol. The solutions were of a yellow color, one showing fluorescence. The oils adulterated with alcohol were colored by magenta and were soluble in 4½ resp. 3½ pts. alcohol of the above specific gravity.—Pharm. Jour. and Trans., Nov. 23, 1889, 415.

Oil of Caraway—Yield and Quality from Norwegian Caraways.—Dr. Nicolaysen communicates some observations respecting the yield and quality of oil from Norwegian caraways. He states that in distilling freshly powdered fruit from Christiania he obtained 6.1 per cent. of oil, whilst caraways from Tromsö, 10° further north, yielded 6.4 per cent. This is rather more than the quantity reported for Norwegian caraways in "Pharmacographia," 5.8 per cent., and as compared with the 4.8 per cent. attributed by Dr. Nicolaysen to Central European caraways, as a mean of twenty-five statements by different authors, is certainly a good yield. Different samples of oil obtained by Dr. Nicolaysen from Norwegian fruit had at 15° C. a specific gravity of 0.9064, 0.9048 and 0.9053, and upon being fractionally distilled yielded 48.9, 47.1 and 48.0 per cent. of carvol. The mean of ten statements respecting the specific gravity of Central European caraway oil is 0.921 at 15° C., and taking the specific gravity of carvol as 0.965 and that of carvene as 0.849, the author calculates that this would represent 64.5 per cent. of carvol and 35.5 per cent. of carvene. It would therefore appear that although the yield of oil from Norwegian caraways is fairly high, the product is relatively poor in the most important constituent, carvol.—Pharm. Jour. and Trans., Feb. 1, 1890, 603; from Chem. Ztg., Dec. 23, 1889, 1704.

Oil of Betel Leaves—Yield at Different Seasons, Characters, etc.—D. S. Kemp, in June 1885, obtained from 152 pounds of fresh betel leaves of mixed quality, on distillation in several portions, using the same original water throughout, 3 fluidounces of oil of specific gravity 1.039 (uncorrected) and 2½ fluiddrachms of a light oil, floating upon the water. He states that Mr. Prebble, of Bombay, again took the specific gravity of the heavy oil about twelve months after distillation, and found it was 1.046. It was pale yellow, freely soluble in spirit, and commenced to boil at 100° C., the boiling point rapidly rising and the oil afterwards acquiring a darker hue. Quite recently (Jan. 1890) Mr. Prebble obtained from 90 pounds of fresh betel leaves 1¼ oz. of a pale-green oil of specific gravity 0.9404 at 28° C., and *no heavy oil.* After keeping this oil a few days it changed to a dark-brown color. It would appear from this as if in January, in the middle of the dry and cold season, the yield of oil is small and only of the light variety. Mr. Kemp also reviews the results of Prof. Eykman (see Proceedings 1889, 602 and 603), and then of Bertram and Gildemeister, respecting the composition of betel-leaf oil, from which it appears that the chief constituents of betel oils are: *terpene* (lævogyre limonene?), boiling point 173°–176° C.; *chavicol*, boiling point 237° C.; *betelphenol*, boiling point 254°–255° C.; and *sesquiterpene*, boiling point about 260° C. The somewhat discordant results of these authors may, perhaps, be explained by the differences observed in the oils distilled in Bombay during the months of June and January.—Pharm. Jour. and Trans., March 15, 1890, 749–751.

Oil of Betel Leaves—Composition.—Prof. J. F. Eykman reports the results of a chemical examination of the volatile oil of betel leaves, distilled by himself from fresh leaves. The oil was pale greenish-yellow, became golden-yellow and brown on exposure, was slightly lævogyre and had the specific gravity 0.969 at 15° C. Caustic potassa removed from the oil *chavicol*, a phenol of specific gravity 1.030 at 15° C., boiling between 236° and 238° C., and having a peculiar odor, somewhat resembling that of creasote; its composition is $C_9H_{10}O$; its aqueous solution is colored blue by ferric chloride, the color disappearing on the addition of alcohol; its construction is expressed by the formula  $C_6H_4 < \begin{matrix} OH(^1) \\ C_3H_5(_3) \end{matrix}$. The crude chavicol seems to contain a small quantity of a phenol of somewhat higher boiling point, and in alcoholic solution becoming blue with ferric chloride. Betel oil, freed from phenol, did not yield, by fractionating, a pure compound in sufficient quantity for examination. The fraction between 173° and 176° contained several terpenes, but no pinene, and had a very agreeable lemon-like odor, while a mint-like odor was observed in the fraction between 190° and 220°. From a higher boiling fraction a hydrocarbon, sesquiterpene, was obtained, having a slight odor, boiling at 260° C., and in acetic solution acquiring a deep indigo-blue color with bromine.

The author also calls attention to the betel oil obtained by Schimmel & Co. (see Proceedings 1889, 602) from dry betel leaves, and shows that the oil did not contain the above compounds to which the fresh leaves owe their characteristic odor; they may have been dissipated by drying, or oxidized by exposure, or lost by remaining dissolved in the water; the use of steam under pressure may have volatilized more of the high boiling phenol than is obtainable by ordinary distillation.—Amer. Jour. Pharm., Feb. 1890, 95–96; from Ber. d. D. Chem. Ges., 1889, 2736–2754.

Betel Oil—Composition.—The dried leaves of *Piper betle* yield on distillation 0.5 per cent. of oil, specific gravity 1.024 at 15°, containing 70–75 per cent. of a phenol which Bertram and Gildemeister have isolated by shaking with dilute aqueous soda, and decomposing the sodium compound with sulphuric acid. The product is *betelphenol*, $C_{10}H_{12}O_2$, a colorless, highly refractive oil of characteristic odor; boiling at 254–255°, and of specific gravity 1.067 at 15°. It has the same empirical composition as eugenol, but gives a greener color with ferric chloride. It also differs from the phenol (chavicol) obtained by Eykman from the oil of fresh leaves. The portion of the betel oil not affected by alkali distilled for the most part between 250° and 275° as a yellow liquid smelling like tea, and yielded crystals of a sesquiterpene hydrochloride, $C_{15}H_{24}2HCl$.—Chem. and Drugg., Feb. 1, 1890, 154.

Citronella (Oil of Andropogon Nardus)—Chemical Investigation.—T. D. Dodge has subjected citronella oil to chemical examination, and obtained results which differ from those obtained by Kremers (see Proceedings 1887, 562). The aldehyde, isolated from the oil by means of a concentrated solution of sodium bisulphite, according to Kremers is $C_7H_{14}O$, while Dodge obtains results corresponding to $C_{10}H_{18}O$ and names the compound citronellic aldehyde. By the action of P_2O_5, an oily product, probably a terpene, was obtained. By heating the dibromide of the aldehyde, the distillate contained a small quantity of oil having the odor of cymene, $C_{10}H_{14}$, thus confirming the statement of C. R. A. Wright (Jour. Chem. Soc., 1875, p. 1). Oxidation with potassium permanganate yielded a mixture of fatty acids smelling strongly of ordinary valerianic acid. A portion of the oil boiling at 77° C. is very likely a terpene. The portion boiling at 222° C. is probably citronellyl alcohol, $C_{10}H_{20}O$, the same as obtained by the reduction of citronellic aldehyde, the acetyl derivatives of both having the same characteristic odor. The oil is, according to this author, similar in composition to oil of tansy, examined by Bruylants, who found an aldehyde, $C_{10}H_{16}O$, the corresponding alcohol, $C_{10}H_{18}O$, and a terpene.—Amer. Jour. Pharm., Jan. 1890, 13; from Amer. Chem. Jour. 1889, 456.

Eulyptol—An Antiseptic Mixture.—It is stated in "Pharm. Ztg." (1890, 21) that "eulyptol" (not to be confounded with "eucalyptol," the important constituent of oil of eucalyptus) is a mixture containing 6 parts salicylic acid, and 1 part each of carbolic acid and eucalyptus oil.

Safrol—Products of Oxidation.—According to Th. Poleck, safrol, when oxidized by potassium permanganate, yields piperonal and piperonylic, carbonic, formic, acetic and oxalic acids, but no propionic acid, as was stated by Schiff in 1884.—Amer. Jour. Pharm., Feb. 1890, 96; from Ber. d. D. Ch. Ges., 1889, 2861.

Volatile Oil of Massoy Bark—Characters and Composition.—E. F. R. Way has examined the volatile oil put upon the market by Schimmel & Co. under the name of ethereal oil of massoy bark, and obtained from a lauraceous plant of New Guinea. The oil is limpid, perfectly clear, yellow, and resembles cloves in odor. Its composition is as follows: (1) a terpene $C_{10}H_{16}$, named *massoyene*, which does not correspond to any hydrocarbon described by Wallach; (2) *safrol*, by oxidation with $KMnO_4$ the odor of piperonal was distinctly noticed; (3) *eugenol* of the formula C_6H $(CH_2$ $CH{=}CH_2)$ OCH_3, OH; (4) a small quantity of creasote-like bodies.—Arch. d. Pharm., Jan. 1890, 22.

Volatile Oil of Carrot—Characters.—The volatile oil of *Daucus Carota* is obtained by Schimmel & Co. by treating the fruit with steam under high pressure. According to Landsberg the oil is yellow, of a pleasant carrot odor and pungent taste, is acid to litmus paper, and easily soluble in alcohol, ether, glacial acetic acid, chloroform, etc. Specific gravity at 20° C., 0.8829. The chemical constituents are (1) a terpene boiling at 159–161° C., and belonging to the pinene group (Wallach), and (2) an oxygenated portion $C_{10}H_{18}O$ closely allied to cineol, and can be regarded as a monohydrated terpene. Acetic acid was noticed in small quantity.—Arch. d. Pharm., Jan. 1890, 85.

Thymol—Compounds with Mercury.—E. Merck has introduced some double salts of mercury and thymol, which are obtained as follows: A warm solution of mercuric nitrate, moderately acidulated with nitric acid, is poured in small quantities at a time, during stirring, into a warm alkaline solution of thymol, as long as the yellow precipitate that forms is redissolved. The liquor is then allowed to stand, and upon cooling forms a crystalline paste, consisting of felted needles of the double compound of mercuric thymolate and nitrate. This is purified by recrystallization from dilute soda solution, in which, when warm, it is freely soluble. Another way is to pour the warm weakly acidulated solution of mercuric nitrate into an alcoholic solution of thymol, this mixture also upon cooling forming a paste of soft felted needles. The former plan has so far the disadvantage that the alkaline solution of thymol becomes slightly colored, so that the product is not purely white, in addition to affording an opportunity for the formation of sodium nitrite, which requires considerable washing for its removal. The pure mercury-thymol double salt is said to be perfectly colorless and odorless, but it gradually becomes reddish, especially if exposed to daylight, and acquires a faint thymol odor. When mercuric nitrate and thymol are used, the salt formed is represented by the formula $(C_{10}H_{13}O)Hg—Hg(NO_3)$; but when mercuric acetate is used the formula is given as $(C_{10}H_{13}O)Hg—Hg(C_2H_3O_2)$.—Pharm. Jour. and Trans., Nov. 2, 1889, 341 ; from Pharm. Ztg., Oct. 12, 1889, 625.

Thymol—Pulverization.—If thymol be powdered in a porcelain mortar the thymol becomes so highly electrified as to adhere provokingly to all substances with which it comes in contact ; it somewhat deports itself like a very deliquescent substance. F. Sengewitz overcomes the difficulty by powdering in an iron mortar, using small quantities at a time and exerting little pressure.—Pharm. Ztg., 1889, 706.

Cinnamon Oils—Distinctions between that of the Leaves, Bark and Root.—The curator of the Museum of the Pharm. Soc. of Great Britain, speaking of a recent donation of Cinnamon-leaf oil prepared from unfermented leaves, draws attention to some points of interest connected with this product. The oil of cinnamon obtained from the leaves, bark and root respectively, differs in composition in each case, that of the *leaves* containing chiefly eugenol, a hydrocarbon having an odor of cymene, a little benzoic acid, and some cinnamic aldehyde ; the *stem bark* yields an oil consisting chiefly of cinnamic aldehyde and a variable quantity of hydrocarbon ; the oil from the *root* contains cinnamic aldehyde, hydrocarbon and ordinary camphor. The elaboration of plant products probably commences in the leaves, is carried on further in the bark, and is completed in the root. The chemical changes thus brought about by this plant seem to indicate for the modern chemist a line of investigation that might be followed with profit, and could not fail to lead to interesting results.—Pharm. Jour. and Trans., March 15, 1890, 749.

Oil of Cinnamon—Adulteration with Rosin.—The adulteration of commercial oils with rosin is confirmed by the work of Dr. H. Gilbert, who also advances a simple test for the detection of this adulterant, and gives some data on the resinification of oils of cinnamon. The detection of non-volatile matter is effected by exposing one gram of the oil in a flat watch-crystal to 110°–120° C. in an air-bath until constant weight is obtained. Various cassia oils yielded from 5 to 30 per cent. residue, two oils (guaranteed pure) 6 and 11 per cent., and in genuine Ceylon oil 2 to 3 per cent. residue. To determine if exposure to light and air could cause such an increase of residue (20–30 per cent.), a steady current of air was passed through a sample of pure cassia oil (leaving 6 per cent. residue) and also one of pure Ceylon oil (with 2 per cent. residue) for *forty* hours ; the experiments were conducted near a window, so as to expose to as much sunlight as possible during the time. The residue from the cassia oil amounted to 6.5 per cent., from the Ceylon oil to 3.5 per cent. ; while resinification could be detected under these favorable conditions, still it was so slight that exposure could not account for very high percentages of residue. A sample of pure cassia oil (specific gravity 1.060) after the addition of 20 per cent. rosin had the specific gravity 1.065. The crystals obtained by mixing the oil with nitric acid cannot be considered as a reliable test, as adulterated oils will also give the crystals, and a pure oil at times fails to produce them. The acidity of the oils gives important information as to the presence of rosin, and is best determined by dissolving 2 gm. oil in 30 c.c. alcohol, adding a few drops of phenolphthaleine and titrating with alcoholic potassium hydrate; the number of milligrams of KOH required to neutralize one gram oil gives the acidity figure.—Chem. Ztg., 1889, 1406.

Cassia Oil—Comparative Examination of Pure and Adulterated Oil.—The practice of certain Chinese merchants to adulterate cassia oil with rosin has led Messrs. Schimmel & Co. to make comparative examinations of pure and adulterated oils, and to communicate their results in their "Report" for October, 1889. These results are given for the pure cassia oils as follows:

Origin.	Color.	Specific gravity at 20° C.	Rectification Residue.
1. Cassia Oil our own distillation, from cassia chips (age: 4 months) . .	pale yellow	1,035	5.4 per cent. liquid.
2. Cassia Oil our own distillation, from cassia buds (age: 4 months) . . .	brownish	1,026	4.4 " "
3. Cassia Oil brand ayong (age: 60 to 80 years) .	"	1,062	6 " "
4. Cassia Oil brand ayong (age: 24 years) . .	yellow	1,060	8 " "
5. Cassia Oil brand ayong (age: 22 years)	"	1,060	7 " "
6. Cassia Oil brand hop lee a. chip (very old) . .	"	1,059	7 " "
7. Cassia Oil brand tac foong (age: unknown)	pale yellow	1,060	5.5 " "
Cassia Oil brand ying chong (age: unknown)	yellow	1,055	7 " "

whereas the notorious adulterated cassia oils gave the following results:—

Origin.	Color.	Specific gravity at 20° C.	Rectification-Residue.
8. Yan loong (Ist lot) . .	reddish brown	1,057	26 per cent. solid.
9. " " (IId ") . .	"	1,059	23 " "
10. Cheong loong (Ist ") . .	"	1,056	24 " "
11. " " (IId ") . .	"	1,051	26 " "
12. " " (IIId ") . .	dark brown	1,061	33 " "
13. Luen tai	"	1,060	38 " "

The demands to be met by a good, merchantable cassia oil, are summed up as follows:

1. Cassia oil should have at 15° C. a specific gravity of 1,050 to 1,070.

2. On distilling, about 90 per cent. pure cassia oil should pass over. The residue must not become solid after cooling and take the character of a brittle rosin, but must remain, at least, semi-fluid. It may amount to from 6 to 7 per cent., but in no case to more than 10 per cent.

No practical value for the detection of resin can be attached to testing the solubility of the oil in more or less diluted spirit, as is proven by the examination of oils which had been purposely mixed with resin and petroleum.

For examining cassia oil, weigh out about 50 gm. of it into a small fraction-retort, connect it with the cooling-tube, and place the thermometer, by means of a perforated cork-stopper, about 5 to 10 centimeters above the fluid. The retort may not be more than half full. At first some water escapes, with a cracking noise, from the fluid. The oil commences, usually, to boil at about 200°. The thermometer rises quickly to 240°. The principal quantity of the oil distils over between 240° and 260°. At last, white vapors develop in the retort, the thermometer rising, at the same time to 280° or 290°. When this has taken place, the distillation is to be interrupted; the residue is allowed to cool in the retort and weighed with it. If the residue becomes hard and solid after cooling, the oil is to be considered adulterated and rejected. Genuine, non-adulterated oil also leaves a residue (up to about 10 per cent.). But it never becomes solid, and remains in a semi-fluid state, also after having cooled off completely. The fraction-retort used must be properly cleaned with hot spirit.

Cassia Oil—Test for Adulterations.—According to E. Hirschsohn cassia oil may be tested for likely adulterations by the following simple tests: (1) Agitation of the suspected sample with three volumes of petroleum ether, specific gravity 0.650, should neither produce an increase nor decrease of the volume of oil taken; a decrease in volume would indicate the presence of other essential oils, fixed oils, resin or kerosin; an increase, the presence of larger quantities of castor oil. (2) The clear petroleum ether layer of the above test agitated for several minutes with copper hydrate (obtained by precipitating copper sulphate solution with solution of potassium hydrate, washing and drying at ordinary temperature) should give no blue or green filtrate; absence of colophony or copaiva. (3) One volume of the oil with three volumes of 70 per cent. alcohol at 15° C. should give a clear or only opalescent solution; should a turbidity or separation take place, the presence of petroleum, fixed oils, other volatile oils or larger quantities of colophony would be indicated. (4) The above 70 per cent. alcoholic solution mixed drop by drop with ½ volume of an alcoholic solution of lead acetate (70 per cent. alcohol saturated at ordinary temperature with lead acetate) should produce no precipitate;

absence of colophony or similar resins.—Amer. Jour. Pharm., June 1890, 294–295; from Pharm. Ztschr. f. Russl., 1890, 225 and 241.

Camphor Oil—Examination of an Old Sample.—Since their former examination of different samples of oil of camphor (see Proceedings 1889, 596), Messrs. Henry Trimble and Hermann J. M. Schroeter have had opportunity to examine a sample of oil which was bottled by the late Frederick Brown more than 50 years ago. This sample of oil of camphor resembled Nos. III., IV. and V. of the authors' previous series most nearly, the difference being a larger percentage of camphor (doubtless due to age), with the addition of camphorogenol and a fraction passing over between 250°–270° C., both in comparatively small amount only. The oil had a deep yellow color, and possessed a pleasant camphoraceous odor. It began to boil at 178° C., had a specific gravity of 0.9467 at 16° C., and possessed strong dextro-rotary power. About 4 per cent. of camphor had crystallized out, and it formed a solid mass of camphor on cooling to somewhat below 0° C.—Amer. Jour. Pharm., July 1889, 333–335.

Camphor—Causes of Scarcity.—Some particulars regarding the causes of the scarcity of Japan camphor are given in "Chem. and Drugg.," (March 8, 1890, 341–342). The camphor forests in Southern Japan are divided into two categories, which furnish the bulk of the world's camphor supplies. In the first category are the forests which are the property of the Government, and kept under the strict supervision of the forest department. They contain a considerable number of trees, but as far as the supply of camphor is concerned, these forests can only be counted upon to a limited extent. At the discretion of the authorities permits are given at irregular intervals to cut down old trees in certain districts, and the production of the Government forests depends on the relative liberality with which permits are issued. On the average the Government forests furnish about one-fifth of the total quantity exported, and cannot be depended on as a regular source of supplies. On the other hand, the forests or trees belonging to private individuals are the base of the supply of the trade. That a considerable decrease of these camphor-trees has taken place is beyond doubt. The provinces of Tosa and Satsuma, in former years the only source of supply, are very nearly exhausted; but in distant parts, beyond the mountains and remote from water, camphor-trees are still to be found. This is of importance, as the present high price of camphor on the spot is further enhanced by transportation through pathless regions, before water, wanted for the distillation of the gum, can be reached. The production has, under these circumstances, and in spite of the abnormally high prices now ruling, not experienced any material increase. At the same time it must be stated that there is now proceeding an extension of the distilling area over new districts, *i. e.*, in provinces comparatively bare of trees, and which up to now gave no camphor. These facts confirm the view that, however high prices may go, the average supplies will not only not experience any essential increase, but, on the contrary, become less and less in future years. The camphor-tree, like the oak, grows very slowly, and it takes several hundred years before the full size has been attained; there is, therefore, no chance for the present generation to derive any benefit from the trees now in course of being planted. The present prices stimulate the production to the utmost, and the fresh gum is being hurried upon the market. The opinion that the native speculators store the camphor in order to raise prices is totally wrong. The largest yield of gum from the trees is obtained during the cold season; first on account of the sap or essential oil contained in the tree then being concentrated in the big roots and the lower part of the stem, and secondly, as the distillation can be done more efficiently by using cold water. This process is performed in a most primitive way on the banks of the nearest brook, and as described in the present paper is essentially that described a number of years ago by Consul Jones of Nagasaki (see Proceedings 1884, 132–133).

Camphor—Definite Compounds with Phenols, which see under "Alcohols."

Monobromocamphor—Production of an Isomeride.—P. Cazeneuve describes experiments made by which he obtained an isomeride of monobromocamphor. Hypobromous acid is prepared by the action of bromine on mercuric oxide suspended in water cooled at 0°, and powdered camphor is agitated briskly with the solution. It forms a reddish-orange liquid, which is washed with cold water, dissolved in alcohol of 93°, agitated with a slight excess of potassium hydroxide to remove bromine, precipitated by the addition of water, washed, dried, and finally crystallized from alcohol of 85°, and from chloroform. The monobromocamphor thus obtained forms ill-defined crystals, which melt at 144–145°, whilst ordinary monobromocamphor melts at 76°. It is insoluble in water, but readily dissolves in alcohol, benzene, ether, and chloroform. A 5.5 per cent. solution in alcohol of 93° has a rotatory power of $[\alpha]_D = +40^\circ$, which is identical with that of the monochlr camphor obtained by the action of hypochlorous acid. With water and dilute acids at high temperatures, with ammonia, and in all reactions, the two derivatives behave in a precisely similar manner. They are therefore doubtless similar in constitution, and the bromine has displaced hydrogen in a CH_2 group of the nucleus. The monochloro- and monobromo-derivatives obtained respectively by the direct action of bromine, or the action of chlorine in presence of alcohol, contain the halogen in the ortho-relation to the carboxyl. It is probable that the isomerides contain the halogen in the para-relation, but they may also be regarded as ethereal salts of a secondary alcohol with the CH.OH group in the nucleus. The latter view is supported by the liberation of hydrochloric or hydrobromic acid by the action of water or dilute sulphuric acid at 150°, and by the production of amines on treatment with ammonia.—Amer. Jour. Pharm., March 1890, 140; from Compt. rend., cix., 439–441, through Jour. Chem. Soc., 1889, 1204.

Thiocamf—A New Disinfectant.—Under the name of thiocamf Dr. J. E. Reynolds proposes a new disinfectant, which is prepared by acting on camphor with sulphur dioxide. At ordinary temperatures SO_2 requires a pressure of more than two atmospheres to liquefy it; but camphor, owing to chemical attraction, can liquefy it without any pressure whatever. In the liquid thus prepared several known bactericides are dissolved. Thiocamf can be preserved without pressure in bottles at mean temperature; mere exposure of the liquid in a thin layer to the air determines the steady evolution of sulphur dioxide. The contents of a six-ounce bottle will yield over 20,000 c.c. SO_2. One ounce of thiocamf shaken up with a quart of water forms a powerful disinfectant for ordinary purposes, while a more dilute solution (1 oz. to the gallon) can be used for soaking clothes which have been in contact with infected persons.—Chem. News, June 22, p. 291.

Oils of Wintergreen and Birch—Identity in Character and Composition.—Messrs. Henry Trimble and Hermann J. M. Schroeter communicate the results of a very complete chemical and physical examination of two samples of true oil of wintergreen and two of oil of birch. The physical properties of these oils were practically identical, as is shown in the following table, which is based on very careful examination:

Sample.	Boiling Point, C.	Specific Gravity at 15°C.
I. Wintergreen	216°	1.1838
II. Birch	217°	1.1840
III. Wintergreen	216°	1.1845
IV. Birch	217°	1.1840

The results of their chemical investigations with the four oils lead the authors to conclusions of which the following is a summary:

1. Previous investigators have found oil of wintergreen to consist of methyl salicylate and a hydrocarbon, called gaultherilene; and oil of birch to be composed of methyl salicylate alone.

2. They find in addition to methyl salicylate, in both a hydrocarbon of the formula $C_{15}H_{24}$, and small quantities of benzoic acid and ethyl alcohol. The amount of the hydrocarbon is from 0.3 to 0.447 per cent., and it becomes solid on standing a short time or on cooling. It is probably made up of a solid and a liquid portion.

3. The oils are physically and chemically identical, the only difference detected being in the melting point of the hydrocarbons. That from win-

tergreen melted at from 10° to 15° C., and that from birch at 18° C. This may depend on the time of collecting the plants or on the age of the oils.

4. A representative sample of artificial oil of wintergreen possessed the physical properties, but not the chemical composition of the natural oils, nor was it pure methyl salicylate.

5. The artificial product, when unmixed with the natural oils, may be identified by the addition of excess of potassium hydrate, when all odor of wintergreen will disappear.

6. It would be undesirable, in the next Pharmacopœia, to replace the almost pure natural oils by an impure methyl salicylate of variable and uncertain composition. No reasonable objection can be offered to the designation by the Pharmacopœia, as oil of wintergreen, of the product from either of the natural sources.

Samples No. 1 and 2 were obtained from Mr. C. M. Driggs, of White Haven, Pa., and were vouched by him to be genuine samples of each. Sample No. 3 from Mr. Underhill, of New Hampshire, and already examined by Mr. Pettigrew (see Proceedings 1884, 257), and sample No. 4, is from the collection of Prof. J. M. Maisch.—Amer. Jour. Pharm., Aug. 1889, 398–405.

Oils of Wintergreen and Birch—Chemical Composition.—Referring to the paper of Prof. Henry Trimble and Hermann J. M. Schroeter on "the oils of wintergreen and birch," Prof. Frederick B. Power observes that from his previous observations, as well as from the results of the present investigation, he is forced to believe that most, if not all, of the conclusions of these authors are positively incorrect, so far at least as they relate to the pure oils in question. The author demonstrates this as follows:

The oils examined in the present investigation were obtained from the following sources:

I. Natural Oil of Wintergreen. This was obtained directly from Mr. Robert B. Wilson, of Black River Falls, Wis., who had distilled the oil himself, and therefore no doubt could exist as to its absolute purity.

II. Natural Oil of Birch. This was obtained from Mr. C. M. Driggs, of White Haven, Pa., the source from which Messrs. Trimble and Schroeter obtained their oil of birch, and at least one specimen of their oil of wintergreen.

Another small sample of the oil of birch in the author's possession represents a portion of the same oil as that used by Mr. Pettigrew in his investigations.

III. Artificial or Synthetical Oil of Wintergreen. This was kindly furnished by Messrs. Fritzsche Bros., of New York, and was manufactured by their Leipzig house, Messrs. Schimmel & Co., who have made a specialty in this product. * * *

In summing up the results of this investigation, the author's conclusions, as contrasted with those of Messrs. Trimble and Schroeter, may be presented as follows:

I. The natural oil of wintergreen consists of methyl salicylate, with small amounts (0.3 per cent. or less) of a terpene. The latter is a slightly yellowish, somewhat viscid liquid, having an odor, as described by Cahours, resembling that of black pepper, a specific gravity of approximately 0.940, and does not solidify or separate any solid substance at a temperature of —10° C. It deviates the ray of polarized light to the left, and cannot be vaporized without decomposition.

II. The oil of birch, when pure, consists simply of methyl salicylate, and is without action on polarized light.

III. The natural oils of wintergreen and birch are, therefore, neither physically nor chemically identical, although the differences are practically very slight.

IV. In the natural oils of wintergreen and birch examined by the author no trace of benzoic acid could be detected, nor has sufficient evidence as yet been afforded to establish beyond doubt the presence of ethyl alcohol in these oils.

V. The artificial or synthetic oil of wintergreen, as manufactured by Messrs. Schimmel & Co., of Leipzig, and which to the author's knowledge is at present the only commercial synthetic oil that is entitled to be designated as a representative product, does not contain any trace of benzoic acid.

VI. The pure synthetic oil of wintergreen cannot be distinguished from either the natural oil of wintergreen or the oil of birch by the addition of an excess of a cold solution of potassium hydrate, nor is any "disagreeable phenol-like odor" produced, as affirmed by Messrs. Trimble and Schroeter. In the case of the artificial oil the odor of wintergreen does not disappear to any greater extent than with the natural oils. On heating either of these oils with a caustic alkali, the wintergreen odor is naturally destroyed, since the chemical compound to which the odor is due becomes thereby decomposed.

VII. With regard to the adoption of the title Methyl Salicylate, and the recognition of the artificial oil of wintergreen by the Pharmacopœia, as the author had suggested in a former paper, no reasonable objection can be urged. It remains, however, for the pharmacists and physicians of this country to decide, whether under the title of Oleum Gaultheriæ the Pharmacopœia should recognize the oil of birch, which is prepared chiefly in a crude manner by farmers and itinerant distillers, and is subject to adulteration with kerosene oil, or whether at least equal recognition should not be given to a pure methyl salicylate, possessing definite physical and chemical characters, and which can always be readily procured.—Pharm. Rundschau, Dec. 1889, 283–289.

Resins, Gum-resins and Balsams—Examination.—Kremel's suggestion to examine this class of substances by Hübl's method of examining waxes (see Proceedings 1889, 653) has induced Dieterich to apply it to the examination of the substances below enumerated.

Resins and Gum-resins.	Acidity-	Ester-	Saponification figures.
Ammoniac, purified	132	73	205
Colophony	157-169.6	———	———
Benzoin, Siam	140	35	175
" Sumatra	112	51.4	163.4
Balsams.			
Canada	84-86.8	———	———
Copaiba Para,	52.3-53.2	———	———
" Maracaibo	73.7-86.8	———	———
" East India	6.5-7.4	10.3-11.2	16.8-18.6
Mecca, crude	42.7-43.8	———	———
" purified	40.1	———	———
Peru	50.4-58.8	196-201.6	246.4-254.8
Tolu, crude	121-126	49-60.6	173.1-181.6
" purified	154-158	14-32.6	172.6-186.6
Styrax, crude	64.4-87	87-162.4	157-249.4
Terebinth. commun.	108.2	———	———
" venet	78.4	———	———

The figures given in the above table are the extremes. Attention is called to the differences in *acidity* of the varieties of copaiba, also that only the East Indian contains esters; so it is possible to distinguish the varieties and even approximate admixtures. The results of the balsam examinations, with the exception of styrax, are fairly uniform and encouraging to further work.—Pharm. Post, 1889, 336; from Helf. Annalen.

Resin from Pinus silvestris—Composition.—The discrepancies in the results obtained with the resin of *Pinus maritima*, *P. Larix* and *P. Abies*, and the uncertain composition of pimaric, sylvic, pinic and abietic acids, have induced V. Shkateloff to investigate the crystalline acid from the Russian resin obtained from *Pinus silvestris*, growing in the Archangel and Wologda Governments. After describing the process employed for the separation of the uncrystallizable substances, the author gives the process pursued for the isolation of the crystalline acid, $C_{40}H_{58}O_5$, which is perfectly white, melts at 143°, is insoluble in water, but easily soluble in alcohol, ether, acetic acid, and liquid hydrocarbons. After fusion, it solidifies to an amorphous, transparent mass, and when heated above 360° a colorless, uncrystallizable distillate passes over. The rotatory power of the alcoholic solution was found, $[a]j = -73.59°$. It decomposes alkaline carbonates with liberation of carbonic anhydride, and the original acid is reprecipitated from the solution on adding a mineral acid. By the action of hydrogen chloride on the alcoholic solution, the acid is converted into an isomeric acid of the same composition—but of different properties, as it melts at 159–160°, and the rotatory power is $[a]j = -92.58°$. From the sodium salt of the original acid, other salts of the following composition were obtained: $C_{20}H_{29}AgO_3$; $(C_{20}H_{29}O_3)_2Ba + 2H_2O$; $(C_{20}H_{29}O_3)_2Ca$, and $(C_{20}H_{29}O_3)_2Cu$. The acid $C_{40}H_{58}O_5$ appears to be a partial anhydride of an acid which gives the above salts, and whose formation may be represented as follows: $C_{40}H_{58}O_5 + H_2O = 2C_{20}H_{30}O_3$. The ethyl salt, $C_{20}H_{29}O_3Et$, was obtained as a heavy oil by acting on the silver salt with ethyl iodide. On distillation, it decomposes with elimination of water and the formation of another ethyl salt, according to the equation $C_{20}H_{29}O_3 Et = C_{20}H_{27}O_2Et + H_2O$. This new compound is a heavy yellow oil which yields a resin with potassium hydroxide. Finally the author shows that the resinification of the acid when exposed to the air consists in an oxidation accompanied by loss of water. The acid described above agrees in properties with Maly's *abietic acid*, but differs from it in composition.—Amer. Jour. Pharm., July 1889, 362–363; from J. Russ. Chem. Soc., through Jour. Chem. Soc., 1889.

Tar — Preparation and Examination.— R. G. Dunwody states that there are at least three methods by which tar is made, perhaps the simplest being that in which the wood is cut into short lengths, split, and the pieces wedged vertically into an iron pot so as to project some distance above the vessel. The whole is then inverted over another iron pot and the wood ignited, the flame rises around the outside of the pot, melting the resin in the wood, which is partly burned on reaching the flame and drops down into the vessel below. This process is employed by pharmacists and others who wish to produce a small quantity of tar for their own use. A second method adopted for the same reasons consists in cutting the wood into lengths of two to three feet, splitting to a diameter of about two inches and placing a number of these at the top of an inclined plane of sheet iron; on igniting the wood the tar runs down the plane and is collected below. The third method is used in preparing larger quantities, and consists in cutting the wood into lengths of two to three feet, splitting it into billets and arranging the end in a pile six to eight feet diameter, covering with bark and then with clay. A fire is then kindled on top, the fuel being some of the poor pieces of pine, and when the whole becomes heated, the tar runs off below through an iron pipe previously inserted for the purpose. The first two processes are very wasteful and the product is much darker than that prepared by the last method, which yields a lighter colored product of a very characteristic tar odor.

The author procured three samples of pine tar—one from Arkansas, made by the first method; another from Georgia, made by the third method, and a sample found in the market under the designation of "North Carolina pure pine tar, refined and especially adapted for medicinal use or any other purposes." The three samples were first spread in thin layers on glass. On holding towards the light the refined tar was found to be smooth and amorphous, while the other two samples were shown to be largely composed of granular transparent masses, which under the microscope assumed a crystalline form, showing brilliant effects with polarized light. These crystals, according to Flückiger (Pharmacographia, 2d ed., page 622), are pyrocatechin. The specific gravity of the refined tar was found to be 1.040, that from Georgia 1.083, and the sample from

Arkansas 1.090. The average specific gravity of tar from coniferes is said to be 1.060. None of the samples was completely soluble in petroleum ether (boiling point 25°–40° C.) All were soluble in 95 per cent. alcohol, absolute alcohol, ether, and chloroform. All were acid to litmus paper and imparted an acid reaction to water. By appropriate experiments, which the author describes, the presence of pyrocatechin was determined in all of the samples; but it was most marked in the Georgia sample, and least in the "refined" sample. It appears from the author's results that the best method of examining a sample of tar would be to take its specific gravity, try its solubility with the above solvents, and examine the ethereal solution of the aqueous extract for pyrocatechin. Comparing a thin layer on glass with a sample of known purity, a microscopic examination would also be of value in determining the quality of a sample.—Amer. Jour. Pharm., Dec. 1889, 600–602.

Soluble Tar—Preparation.—A writer in "Nouv. Remédes (Dec. 24, 1889) having the object in view of obtaining solubility in water of vegetable tar and all its components, observes that saline waters do not dissolve tar, either pure or combined with an alkali, but that tar when saponified is very soluble in distilled water after elimination of the excess of alkali. Following this indication, the following formula was devised, quite different from those thus far published. Take of Landes tar (from Pinus maritima), 1,000 gm.; dry soda, 140 gm.; water, 800 gm. The soda, in solution, is poured over the tar, stirring, and left in contact for two hours. Another mixture is made as follows: Water, 9 kil. 250 gm.; marine salt, 2 kil. 500 gm.; crys. carb. soda, 1 kil. 200 gm. The salts are dissolved in boiling water and to this is added the first solution. After 5 minutes of stirring the fire is drawn. In a few days the mother liquors separate and the tar is run off and washed with its weight of water by decantation. The liquors, if kept to a proper strength, may be used repeatedly. The author has called this "soluble tar" because it is integrally soluble in 2 or 3 times its weight of distilled water. Greatly diluted, the preparation takes the form of a persistent emulsion resembling absinthe liquor.—Amer. Jour. Pharm., Feb. 1890, 92–93.

ALCOHOLS.

Alcohol—Purification for Laboratory Use.—Prof. E. Waller communicates the following method for the purification of alcohol, on which method he asks criticism:

A convenient amount of the alcohol to be purified is shaken with pulverized potassium permanganate until it assumes a decided color. It is then allowed to stand for some hours until the permanganate has been decomposed and brown manganese oxide is deposited. A pinch of pulverized calcium carbonate is then added, and the alcohol distilled at the rate of about 50 c.c. in twenty minutes from a flask provided with a Wurz tube or one of the Lebel-Heninger pattern. The distillate is tested frequently until about 10 c.c. thereof, when boiled with 1 c.c. of strong (syrupy) solution of caustic soda or potash, give no perceptible yellow coloration on standing for twenty minutes or half an hour. What distils over after that time is preserved for use.

The first distillates may be added to the small amount remaining in the distilling flask (which should not be driven down to complete dryness), and a fresh portion of purified alcohol recovered.

The rationale of the proceeding appears to be that the permanganate oxidizes and destroys chiefly the fusel oil, furfurol, and other compounds of that nature, the acids resulting from the reaction are neutralized by the calcium carbonate added before distillation, and by distilling slowly the aldehyde, at least, is concentrated in the first portions of the distillate. Distillation of alcohol containing caustic potash or soda seemed to cause a constant formation of aldehyde. The alcohol thus purified is perfectly neutral, and gives most satisfactory results when used as a solvent for caustic alkalies or silver nitrate, the solutions remaining as colorless as distilled water, even after boiling and standing indefinitely, if properly protected from dust and other external influences.—Amer. Drugg., March 1890, 54; from Jour. Am. Chem. Soc.

Alcohol—Purification.—The purification of alcohol is best accomplished, according to Schmitt, by taking crude alcohol containing 30 per cent. by volume, adding potassium carbonate (not enough to cause two layers to form), and agitating with petroleum ether; this solvent removes completely the fusel oil from the alcohol. After separating the light layer, potassium carbonate is added to the alcohol in sufficient quantity to form two layers, the lower one consisting of a saturated solution of potassium carbonate, the upper one of 94 per cent. alcohol containing a small quantity of potassium carbonate. The alcohol layer is syphoned off and mixed with just sufficient strong sulphuric acid to precipitate the potassium salt as sulphate, which is insoluble in alcohol of 94 per cent., and which can then be removed. Alcohol purified in this manner, without distillation, it is claimed, can not be distinguished from that purified by the usual method. —Pharm. Centralh., 1889, 722.

Alcohol—Titration with Chromic Acid.—R. Bourcart recommends a process of titrating alcohol with chromic acid. The diluted alcohol is heated with dilute solutions of potassium bichromate and sulphuric acid and gradually oxidized, first to aldehyde and then to acetic acid. The conversion is quantitative, ⅔ of a mol. of bichromate of potassium being required for the oxidation of 1 mol. alcohol. The author operates in tubes sealed at both ends, or in a tube sealed at one end and closed at the other with a caoutchouc stopper, the end of which is. secured in any convenient manner. After being heated for two to three hours in a boiling water-bath the tube is let cool. The liquid is then mixed with a sufficiency of potassium iodide, so that the iodine set free may re-dissolve, and titrated with hyposulphite until the color passes from a dirty yellow to a yellowish green. Starch-paste is then added, and the titration is continued until the dark violet color disappears. The liquid does not become colorless, as it is colored a turquoise blue by chrome-alum, which, however, does not interfere with the sharpness of the reaction. The author uses a solution of bichromate containing exactly 5 gm. per litre (in some cases, also, a 1 per cent. solution), a sulphuric acid of 25 vol. per cent. (in some cases 10 per cent)., a 10 per cent. potassium iodide solution, and a 2 per cent. solution of starch which has been boiled and filtered. The solutions of alcohol taken for examination are of about 0.5 per cent. To 10 c.c. of such dilute alcohol there are used about 50 c.c. of the 0.5 per cent. solution of bichromate and 10 c.c. of the 25 per cent. sulphuric acid.—Chem. News, March 7, 1890, 121; from Bull. Soc. Ind. de Mulhouse.

Alcohol—Determination of Impurity with Potassium Permanganate.—Working with the permanganate test, Cazeneuve uses as a standard of comparison pure alcohol of 93° and a 1 in 1000 potassium permanganate solution; 10 c.c. of the standard alcohol at a temperature of 15°–20° requires five minutes to give with 1 c.c. of permanganate a slightly yellowish rose tint, indicating that the reduction is not quite complete. An ordinary alcohol of 93°, under the same conditions, exercises a much more rapid reducing action, and this increased rate of action indicates impurity.—Chem. and Drugg., Feb. 1, 1890, 154.

Alcohol—Dietetic Action.—Dr. Alexei M. Mohilansky has undertaken careful experiments on 15 healthy men, aged from 18 to 28, in order to study the action produced by an occasional (dietetic) use of alcohol, and sums up the results of his observations as follows:

1. In habituated people, alcohol, when taken in moderate quantities, distinctly improves appetite and gives rise to a marked increase in the assimilation of the nitrogenous constituents of food, the average surplus amounting to 2.09 per cent., the maximal to 4.22 [*e. g.*, a patient who had been assimilating 93.10 per cent. of nitrogen, without alcohol, proved to be assimilating 96.07 per cent. when alcohol was added to his dietary.]

2. In habitual total abstainers, however, the assimilation somewhat sinks (0.28 or 0.33 per cent.)

3. The increased assimilation in the former category must be attributed to a more complete absorption and intensified gastric digestion, which result from a prolonged retention of food in the stomach, on one side, and from increased digestive power and secretion of the gastric juice (Claude Bernard, Kretschy, Richet, Lever, Petit et Semerie, Glucinski).

4. The nitrogenous metabolism, or disintegration of systemic proteids, almost invariably (in 13 out of 15 cases) decreases, the average fall being 8.73 per cent., the maximal 19.42, the minimal 0.14 [*e. g.*, in a patient in whom the metamorphosis in non-alcoholic days had amounted to 80.11

per cent., in alcoholic ones it fell to 63.78]. The decrease is observed very frequently even when small doses are taken; it is invariable in the case of moderate or middle-sized ones. However, there does not exist any strict parallelism between the dose and the amount of the inhibition of the metabolism.

5. The decrease remains still perceptible for some while, even after discontinuing alcohol.

6. It is probably dependent mainly upon alcohol inhibiting the systemic oxidation processes (V. A. Manassein, Schmiedeberg, Boecker), and further, upon its deviating the blood pressure, dilating blood vessels, retarding the circulation, and depressing the bodily temperature.

7. Alcohol also diminishes somewhat the assimilation of fats (to judge from the fact that the amount of fatty acids eliminated with fæces is augmented).

8. It does not possess any diuretic action; on the contrary, it rather tends to inhibit the elimination of water by the kidney, which after all should be expected beforehand, since alcohol dilates cutaneous blood-vessels and depresses the arterial tension, that is, favors cutaneous perspiration and interferes with the renal action. [As a matter of fact, in two patients the daily amount of the urine remained unaltered; in five, it increased on an average 7 per cent., while in eight it fell 12 per cent.]

9. Such organs as are not habituated to the use of alcohol show a much stronger reaction towards the substance than habituated ones.—Amer. Jour. Pharm., Dec. 1889, 622–623; from The Med. Chron., Nov. 1889.

Ether—Quality as Found in Michigan.—H. J. Frost read a paper on the commercial quality of ether before the Michigan Pharm. Assoc. (1889), which is very exhaustive in detail. Authorities and references were given in full, and the paper is most valuable as a treatise upon the analysis of and detection of impurities in commercial ether, according to the methods pursued by various investigators. It is of a character, however, that does not admit of valuable abstraction. Tabulated results show that while no sample of ether is perfect in all respects, yet all examined may be considered fairly up to U. S. P. standard.—Pharm. Era, Nov. 1889, 416.

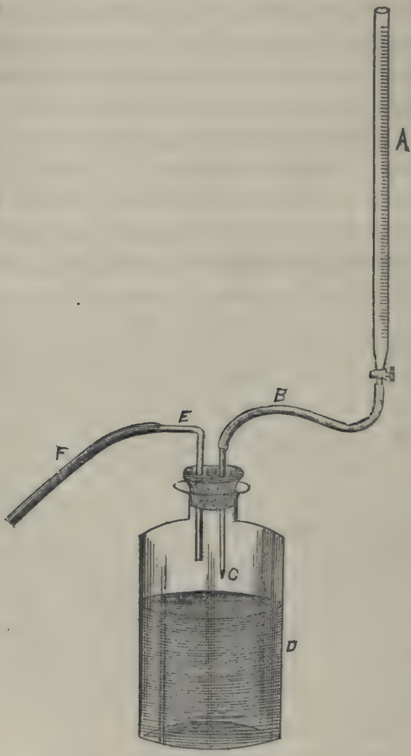
Ethyl Bromide—Process to Secure Absence of Ether.—Dr. C. Brunnengräber states thatethyl bromide, made by the following directions, is obtained free from ether, which is so difficult to remove. To a cold mixture of 12 parts sulphuric acid and 7 parts alcohol of specific gravity 0.816, are added slowly 12 parts powdered potassium bromide and the mixture distilled from a sand-bath. The distillate is repeatedly agitated with fresh portions of water, as long as this removes anything; then the ethyl bromide is agitated with strong sulphuric acid, allowed to stand for 12 hours, removed from the acid and shaken up with 10 per cent. solution of potassium carbonate separated, dried by use of fused calcium chloride and distilled at a temperature of 38° C. from a water-bath. Ninety-nine parts of the distillate are mixed with one part absolute alcohol for preservation. The preparation has a sp. gr. 1.455 to 1.459, and boils at 38 to 40° C.—Apoth. Ztg., 1890, 130.

Ethyl Bromide—Possible Presence and Detection of Chloroform.—Dr. L. Schlovien observes that in the preparation of ethyl bromide from potassium bromide, alcohol and sulphuric acid, the product always contains ether which cannot be removed in the rectification, and which will give a preparation of low specific gravity. To overcome the low gravity it is not unlikely that chloroform may be added until the correct gravity is obtained; such an addition could only be detected by chemical means, and here the simplest test depends upon the isonitril reaction: A few c.c. of the sample with an equal volume of strong sodium or potassium hydrate solution and one drop of aniline are agitated in a test tube; the application of a little heat should develop no odor differing from the cold mixture. Bromide of ethyl with 1 per cent. of chloroform gave immediately the offensive odor of carbylamine. This same test allows of the ready distinguishing between chloroform and ethyl bromide.—Pharm. Ztg., 1890, 138.

Ethyl Bromide—Successful Use in Dental Operations.—Dr. H. Thoms states that ethyl bromide has lately been so successfully used in dental operations that preference is given to it over chloroform, nitrogen monoxide and cocaine salts; its success is ascribed to the purity of the chemical as at present made from alcohol, potassium bromide and sulphuric acid. It resembles chloroform in that the pure substance is easily decomposable, and the addition of 1 per cent. of alcohol or ether retards or prevents the decomposition. The specific gravity of pure ethyl bromide at 15° C. is 1.4735, while that containing 1 per cent. alcohol is 1.457 at 15° C. Tests of purity are: 1. The absence of color when shaken with an equal volume of concentrated sulphuric acid, and 2. water agitated with ethyl bromide, after separation, should not react acid, nor give a turbidity with silver nitrate solution.—Pharm. Ztg., 1889, 705.

Ethyl Nitrite—Determination in Spirit of Nitrous Ether.—John C. Thresh describes a method for the estimation of ethyl nitrite in spirit of nitrous ether, which requires simple apparatus that can be constructed at short notice, and is as accurate as any of the official processes of assay. He uses, as also suggested by Dott, the reaction that takes place when nitrous ether is added to a fluid containing potassium iodide and sulphuric acid, the liberated iodine being titrated with hyposulphite. The apparatus required is shown in the accompanying cut (Fig. 42). A flask or wide-mouthed bottle, *D*, capable of holding about 350 c.c., is provided with a rubber stopper having two perforations, the one bearing a glass tube *E* bent at right angles, and capable of being raised from or lowered into the liquid contained in the flask. The tube *E* is connected by means of the rubber tube *F* with the regular coal-gas supply of the laboratory. The second opening is provided with the glass tube *C*, to which the rubber tube *B* is attached, and, when required during the process, these tubes may be removed or the burette *A* may be attached to *B*. Having placed about 250 c.c. of water into the flask, add about 2 grams of potassium iodide, a few drops of starch solution, and 10 c.c. of dilute sulphuric acid.

FIG. 42.



Apparatus for Estimating Ethyl Nitrite.

Insert the stopper and depress the tube *E* until the end is about half an inch beneath the surface of the liquid in the bottle, and pass a brisk current of gas for ten minutes. The escaping gas can be ignited at the end of a piece of glass tube pushed through the second aperture in the stopper. Now remove this tube, after extinguishing the gas and raising the tube *E* until the end only just projects below the lower surface of the rubber stopper, and introduce into the flask 5 c.c. of the spirit of nitrous ether, by means of a pipette with stem sufficiently long to reach to the bottom of the bottle. The pipette should slip easily through the aperture, and yet allow of no escape of gas or vapor. As soon as the pipette is pushed through the stopper the gas must be turned off. Allow the spirit to flow into the flask very slowly indeed, at the same time imparting a gentle rotatory motion to the liquid in the flask. There must be no shaking, no appearance of effervescence, or the results will be inevitably too low, from loss of the volatile ethyl nitrite.

The gas tap must be turned now and again for an instant to relieve the pressure within the bottle and allow the spirit to flow in. The whole of the spirit having been introduced, the pipette is withdrawn, the burette tube "C" quickly inserted, and the hyposulphite run in until the color of the solution is discharged. All violent agitation must be avoided, otherwise nitric oxide is evolved with visible effervescence, and a loss of iodine ensues; a gentle rotatory motion is quite sufficient.

A second determination is made by simply introducing another 5 c.c. of the spirit with the same precautions as before, and repeating the titration. If the spirit contain less than 1.5 per cent. of ethyl nitrite a third determination may be made with the same solution.

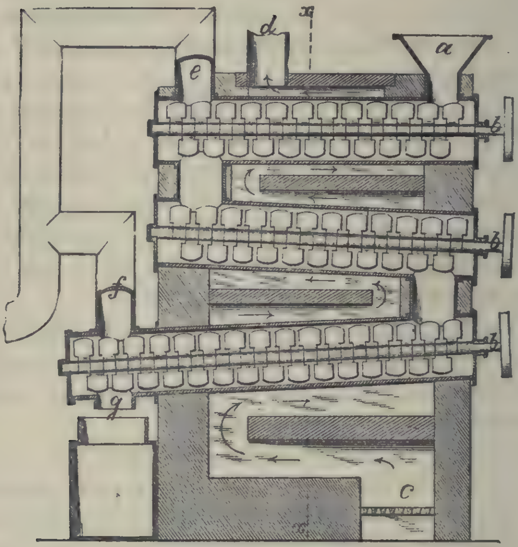
Each c.c. of volumetric solution used corresponds to 0.075 milligram of ethyl nitrite, but a correction of 1 per cent. of the total amount found must be made for the oxygen dissolved in the volumetric solution, a quantity so small that it might well be disregarded were it not so easily effected. The author gives practical examples which leave no doubt as to the accuracy of his process. Obviously the method can be readily used for the estimation of nitrites in general.—Pharm. Jour. and Trans., March 15, 1890, 752–755.

Ethyl Nitrite—Preparation of the Pure Ether for Making Spirit of Nitrous Ether, which see under "Pharmacy."

Chloroform—Improvements in Methods for its Manufacture.—Prof. Samuel P. Sadtler describes the process of the manufacture of chloroform from acetone as now conducted on an extensive scale, a process which is by no means new, having been described by Liebig as early as 1832. Nevertheless there is sufficient novelty in the details of the process to warrant the issue of a patent, covering the various steps in the process, from the production of the acetone to the final production of the chloroform. Prof. Sadtler, having had opportunity to thoroughly study the new process in practice, gives an outline sketch of this recent revolution in its manufacture, which is essentially reproduced in the following:

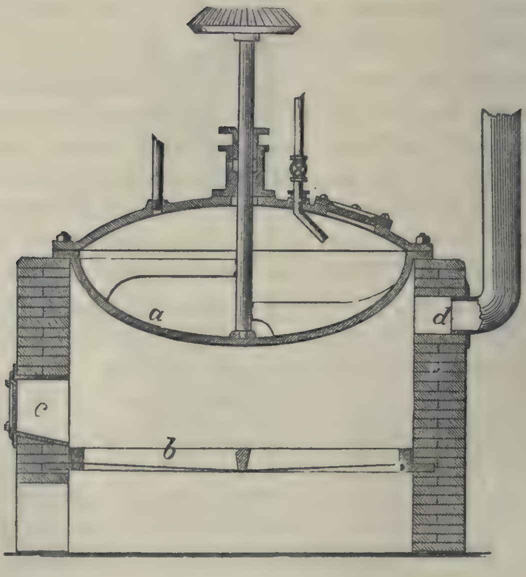
The raw material with which the beginning is made is the "gray acetate of lime." While this is distinctly purer than "brown acetate," it still contains both moisture and tarry matter. To free it from these and to raise the percentage of actual acetate of lime, it is carefully roasted before being submitted to dry distillation. As shown in Fig. 43, this is done in a series of three slightly-inclined cylindrical retorts, in which the material is continually pushed forward by revolving blades. The crude gray acetate

FIG. 43.



Manufacture of Chloroform.

FIG. 44.



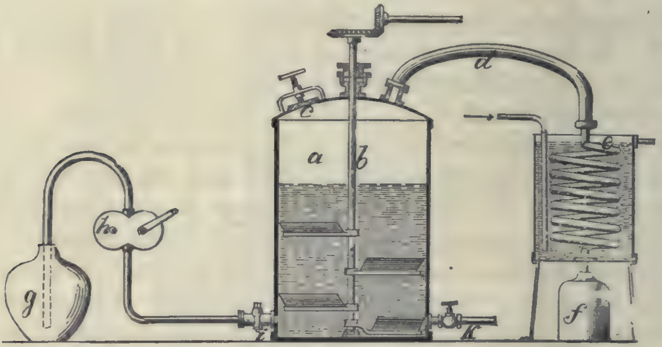
Apparatus for the Manufacture of Chloroform.

is dropped in at *a* and passes along the length of the upper retort until it drops upon the blades which revolve in the second retort, and passing along this is dropped into the third or lowest retort, from which it issues at *g*, and is collected in suitable vessels. As seen in the illustration, the inclination of these three retorts is different, so that the material passes along most rapidly as it descends into the hottest retort below. At *e* and *f* are connections with the flue, through which the moisture and tarry vapors can pass off. By this continuous roasting process, the crude material can be purified without notable decomposition of the true acetate.

The next step consists in the distillation of the grey acetate. Here, to secure the maximum yield of acetone, the points to be attained are uniformity of temperature throughout the whole mass and slow heating to not over 300° C. Fig. 44 shows the form of retort in which this is effected. It will be seen mechanical agitation is provided for by the paddles which rotate around the vertical central axis. Steam is admitted by one of the openings above, while the products of distillation pass off by another opening in the top of the retort. The crude acetone distillate so obtained, while richer than before in real acetone, still contains oily distillation products and much water from condensed steam. In this dilute state it is treated with milk of lime to remove the higher ketones and other compounds. It is then distilled from a large plain still and the fractions rich in acetone passed to a column-still where it is rectified until it becomes almost if not quite anhydrous. In practice, two column-still rectifications are carried out, one after the other, so that the pure acetone shows 99° or 100° by the alcoholometer. It is now fitted for use in the direct manufacture of chloroform.

In order to get the full yield of chloroform, it is necessary to distil the acetone with a much larger proportion of bleaching powder than that given in Watts' Dictionary of Chemistry (Vol. I., page 918), and it is stated that for 58 pounds of acetone at least 600 pounds of chloride of lime of thirty-five per cent. available chlorine are necessary. The yield will then be from 150 to 180 per cent. of the weight of the acetone employed, instead of about 33 per cent. The construction of the still and connections is shown in Fig. 45. The still having been filled to a proper height with water, as shown in the cut, the charge of bleaching powder is introduced, and the man-hole *c* closed with cement. The agitators having been started by means of the revolving shaft *b*, the acetone, previously diluted, is pumped in gradually at *i*. As it enters, it rises and reacts with the bleaching powder solution, and the chloroform produced distils spontaneously from the delivery tube *d*, passes through the condenser *e*, and is collected under water at *f*. The introduction of the diluted acetone is to be effected at intervals only, otherwise some acetone will distil over unchanged, or the reaction will become too violent and much frothing ensue. When the delivery of chloroform begins to slacken, steam is gradually introduced to heat up the mixture and drive over the last portions of the chloroform which remain. The contents of the still are then discharged through the outlet *k* into the drain. They consist of very dilute calcium acetate solution mixed with calcium hydrate and calcium chloride.

FIG. 45.



Apparatus for the Manufacture of Chloroform.

The reaction for this production of chloroform from acetone seems to be simply:

$$2C_3H_6O + 6CaOCl_2 = 2CCl_3H + Ca(C_2H_3O_2)_2 + 2Ca(OH)_2 + 3CaCl_2.$$

This would demand one equivalent of chloroform for one of acetone used, or 206 parts of chloroform by weight reckoned on the weight of the acetone. In practice 180 parts are usually obtained, although 200 parts have actually been obtained at times.

The chloroform obtained is quite free from the chlorinated side products which often accompany the chloroform made from alcohol. It is, nevertheless, thoroughly purified by treatment with sulphuric acid and careful washing, and it is then brought exactly to the U. S. Pharmacopœia standard. —Amer. Jour. Pharm., July 1889, 321–326.

Chloroform—Purification of such as is Decomposed by Age.—A. Campbell Stark draws attention to a sample of chloroform, from a reputable maker, which, after exposure for five months in his laboratory, had become decomposed. The products of decomposition were hydrochloric acid, chloro-carbonic acid, and possibly free chlorine or phosgen gas. For the purification of chloroform so changed the author recommends the following series of processes:

1. Wash twice with distilled water.
2. Heat with 1 per cent. of strong colorless H_2SO_4 and repeat, if necessary, until the H_2SO_4 comes down colorless.
3. Heat with solution of NaHO (of specific gravity 1.33) in the proportion of 3 per cent. of the chloroform used, and distil.

4. Add to the distillate 5 per cent. of dried chloride of calcium, and redistil from a water-bath at a temperature of 60° to 61° C.

The above series of operations applied to 20 c.c. of the sample referred to yielded 15 c.c. of nearly pure chloroform (=75 per cent.).*—Pharm. Jour. and Trans., Nov. 23, 1889, 407.

Chloroform—Cause of Color-Reaction with Sulphuric Acid.—Dr. C. Schacht records a number of interesting experiments made to determine the substance in chloroform that produces a color-reaction with sulphuric acid, and the relation of this substance to the stability of the chloroform. He had found, namely, that the substance that produces the color reaction with sulphuric acid apparently acts as a preservative and prevents the decomposition of the chloroform. His experiments further showed that 0.5 gram of pure amyl alcohol in 850 gm. of pure chloroform—free from æthyl alcohol—was readily evidenced by sulphuric acid, but that the chloroform in such admixture with the acid remained undecomposed for over a month; while the same chloroform, mixed with one-tenth per cent. of pure æthyl alcohol, was decomposed in the course of eight days. In the same manner, experiments were made with propyl, methyl, and isobutyl-alcohol. The latter developed coloration with the acid within 3 hours, while in the case of the propyl it took a considerable time; but in neither case was the chloroform decomposed. With methyl alcohol there occurred no coloration, but the chloroform was decomposed.—Arch. d. Pharm., Oct. 1889, 865–868.

Bromoform—Doses and Preparation.—L. Reuter draws attention to bromoform, which has recently been recommended by Dr. Stepp in the treatment of whooping cough. The daily dose ranges from 5–10–15–20 drops in four fl. ozs. water (f℥i–f℥ij alcohol increases the solubility of bromoform in water) given in hourly doses of one to two teaspoonfuls. The dose is in direct proportion to the intensity of the infection and the age of the patient. Bromoform differs from chloroform (which was also used, but found to be of no value) in its internal administration, by not acting upon the mucous membranes. It is prepared by adding bromine to a solution containing equal parts of potassium hydrate and methyl alcohol until a faint yellow color appears; the bromoform is freed from acid by washing with sodium carbonate solution, dehydrated over calcium chloride and rectified. It forms a colorless liquid, specific gravity 2.8, boils at 150° C., and is only slightly soluble in water, 100 c.c. water dissolving after persistent agitation only 5–6 drops.—Pharm. Ztg., 1890, 5.

Iodoform—Preparation Direct from the Mother-liquors of Sea-weed.—Sulliot and Raynaud's process for the direct preparation of iodoform from kelp-ash (see Proceedings 1889, 619), is further explained by Casthelaz as carried out at the factories near Rouen. The iodide of sodium is taken from the cinders, and, on the following day, the total amount of iodine is precipitated as iodoform. The bromides of potassium and of sodium remain in the liquors, whence they are taken by the usual processes. Iodoform made by this process is called by Casthélaz

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* Unless a certain quantity of alcohol is added before the final re-distillation (4) the purified chloroform will probably soon suffer the same decomposition.—REP.

Absolute Iodoform, because "iodoform by acetone is the result of a complete reaction, without production of free iodine capable of giving rise to iodic compounds; it is obtained directly from the alkaline iodides in a state of great purity, and may, perhaps, be considered absolute." In consequence of its purity, the odor of iodoform thus made is very weak; the substance appears in pale yellow, mica-like scales, and is soluble without residuum in alcohol, ether, chloroform, and the sulphide of carbon.—Congrès de Thérapeutique, 1889.

Iodoform—Economy in its Preparation.—T. W. Bowen compares the merits of the older process (Filhol's) for preparing iodoform with the one recently proposed by Sulliot and Raynaud (see Proceedings 1889, 619) consisting of the decomposition of potassium iodide by acetone and sodium hypochlorite in solution made alkaline by sodium hydrate. The claimed superiority for this latter process is in the theory that all the iodide is converted into free iodine, and is then acted upon by the acetone to form iodoform. Iodates of sodium or potassium are formed if the hypochlorite solution be not very dilute. To produce 1 lb. of iodoform by this method, the following quantities, with corresponding prices, are necessary:

Material.	Quantity.	Cost.
Potass. iodide,	2 lbs. 2.04 oz.	$6.505
Acetone,	3 ozs. 121.2 grs.	.26
Sod. hydroxide,	1 oz. 300.6 grs.	.065
Sod. hypochlorite,	19.5 gals. (U. S. P., 1870),	.976
	Total,	$7.81

By Filhol's process, a parallel table is:

Material.	Quantity.	Cost.
Iodine,	2 lbs. 2.9 ozs.	$7.65
Sod. carb.,	9 lbs. 3.7 ozs.	.17
Alcohol,	4 lbs. 8.5 ozs.	1.23
Hydrochloric acid,	" " "	.22
Black oxide manganese,	" " "	.22
	Total,	$9.49

(All weights are Troy.)

It is thus seen that the new process costs 21.5 per cent. less than the old, no account of labor being considered. The author states that the new process is by far the easier and quicker, and believes that further trials would show still better results than he here gives.—Pharm. Era, Nov. 1889, 414; from Proc. Mich. Pharm. Assoc., 1889.

Iodoform—Increase of Solubility by the Intervention of Camphor.—According to Dr. Audie–Sarzeau, camphor exercises upon iodoform a considerable solvent power. He states that whilst 10 grams of alcohol alone will dissolve at most 0.125 gram of iodoform, the quantity that can be dissolved is increased to 1 gram if the alcohol be first saturated with camphor. A similar result is obtainable with an ethereal solution of camphor.—Pharm. Jour. and Trans., March 29, 1890, 792; from Pharm. Ztg., March 22, 1890, 181.

Iodoform—Administration.—Dr. Besner orders for scrofulous children iodoform, 0.1, in clarified honey, 100–150 gm. Dose: A teaspoonful three times a day.—Amer. Jour. Pharm., April 1890, 172; from Rev. Gén. de Clin., 1889.

Chloral—Posology.—Yvon cites the principal mixtures now in use for the administration of chloral. As a Hypnotic: Chloral, 2 to 5 gm.; bromide of sodium, 1 to 3 gm.; syrup of codeine and syrup of laurocerasus, āā 15 to 20 gm.; water, 100 gm. For Cardiac Dyspnœa (Sée): Choral, 2 to 4 gm.; potassium iodide, 1.25 gm.; mucilage, 120 gm.; a tablespoonful every hour. Enema for Convulsions: Musc. 20 cgm.; camphor, 1 gm.; chloral, 50 cgm. to 1.50 gm.; yelk of egg, No. 1; water, 100 gm. For Suppositories: Chloral, 1 gm.; cacao butter, 3 gm.; ext. hyoscyamus, 1 to 2 cgm.—Amer. Jour. Pharm., Feb. 1890, 92; from Arch. de Neurologie.

Chloral Hydrate—Solvent Action upon the Blue Pigment of Glass.—L. Reuter has observed that some crystals of chloral hydrate adhering to the sides of a blue glass bottle had acquired an intense blue color. By dissolving these crystals in water and filtering, the coloring matter could be separated; the blue pigment was dissolved by chloral hydrate if the latter was melted by aid of a water-bath, but on addition of water was reprecipitated. The chloral hydrate obtained free from the coloring impurity (found to be due to traces of nickel, originally present in the smalt used in coloring the glass), answered all the requirements of the German Pharmacopœia, barring a slight residue obtained when dissolving in ether-alcohol and which residue was found to consist of formate. This mutual decomposition, so accidentally discovered, is of sufficient interest to warrant experiments made with glass of various kinds.—Pharm. Centralh., 1889, 477.

Chloral Hydrate—Compound with Antipyrine.—Chloral hydrate and antipyrine triturated together liquefy; from the liquid, after some time, separate white crystals, which, examined by L. Reuter, were found to be an addition product of the two molecules or trichloraldehyd-phenyldimethylpyrazolon. The compound was found to be therapeutically inactive.—Apoth. Ztg., 1890, 45.

Chloralamid—A New Hypnotic.—Von Mehring has introduced a new hpynotic, a product of chloralanhydride and formamide, which he has named "chloralamid," it being chemically speaking "chloral-formamid." Chloralamid forms colorless crystals, which are soluble in nine parts of water and in one and a half parts of alcohol. Its taste is mild, slightly bitter, but not biting. The watery solution keeps well; but when heated or in the presence of alkali, chloral hydrate and ammonium formate are produced. It has been given in doses of 2 to 3 grams (30 to 45 grains); sleep is usually produced in one-half to three-quarters of an hour. No unpleasant after symptoms and no circulatory disturbances have been observed.—Amer. Jour. Pharm., Oct. 1889, 523.

Chloralamide—Hypnotic Action.—Dr. D. R. Paterson communicates the results following the administration of chloralamid to a number of hospital patients. It was given in fourteen cases of insomnia, including simple sleeplessness and that consequent upon phthisis, heart disease and enteric fever. Upon the whole the results obtained were encouraging, for although the action of the amide is not quite so rapid as that of chloral hydrate, sleep coming on from half an hour to an hour after its administration, this is considered to be more than compensated for by the almost entire absence of action upon the circulation. The new hypnotic, however, appears to be not quite free from some of the disadvantages attending the use of others, since in some instances doses of 30 grains and 45 grains were followed by giddiness, feeling of sickness, dryness of mouth, and even slight delirium. As a rule sleep lasting about eight hours followed its administration, and in cases of phthisis its influence in restraining sweating was very marked; but the insomnia and restlessness due to pain were little, if at all, affected by it. Dr. Paterson thinks some of the published doses to be much too large, at least to begin with, especially if the patient has been ill some time. He has found that usually from 30 to 45 grains is sufficient for a man, while 20 to 30 grains will give satisfactory results in a woman.—Pharm. Jour. and Trans., Nov. 2, 1889, 341; from Lancet, Oct. 26, 1889, 849.

Chloralamid—Value as a Hypnotic.—W. Hale White calls attention to the value of chloralamid as a hypnotic. His experience in twenty cases of suffering from various illnesses, in all of which insomnia was a troublesome symptom, leads him to the conclusion that in chloralamid we have a safe hypnotic, which hardly ever has any depressing effects, which does not produce indigestion, and very rarely gives rise to any unpleasant results. We do not, of course, yet know what harm may result from its prolonged use.—Amer. Jour. Pharm., March 1890, 148–150; from Brit. Med. Journ.

Chloralimide—Source, Character and Uses.—Attention has recently been called to the possible value of "chloralimide" (CCl_3—CHNH) as a medicinal agent. The substance must not be confounded with that recently introduced under the name "chloralamide," which is more correctly designated chloral-formamide. Chloralimide was first described some twelve years ago by Pinner and Fuchs, who obtained it by the action of ammonium acetate upon chloral hydrate. Behal and Choay now claim that it can be obtained in a state of greater purity as a residue from the action of heat upon chloral ammonia. The product so obtained is described as forming long colorless and tasteless needles, slightly soluble in water, rather soluble in alcohol, and very soluble in ether. It is very stable, not being altered by air, light or moisture, or by heating in a sealed tube to 150° C. in the presence of water; but at 180° it is said to be decomposed into chloroform and formamide. In contact with a liquid acidulated with mineral acid it is stated to be decomposed into chloral and the corresponding ammonia salt, but this reaction does not occur with organic acids. Further it is affirmed that in doses of 0.25 to 0.50 gm. chloralimide has been ascertained to possess remarkable antipyretic and analgesic properties. M. Choay also claims that it would surpass chloral ammonia or chloral formamide in activity, since an equal weight would yield more chloroform than either, whilst it presents the advantage of being stable and free from unpleasant taste and odor.—Pharm. Jour. and Trans., March 29, 1890, 789, from Rèpertoire, March 10, 1890, 109.

Chloralimide—Inappropriate Name, etc.—Ritsert points out that the name chloralimide applied to the above substance is not free from objection, since chloral, as an aldehyde, is characterized by an hydroxyl group, which is no longer present in this compound. He thinks it would be more scientific to speak of it as *Trichlorethylidenimide.* Further the statement that the compound is split up by heating to 180° into chloroform ($CHCl_3$) and formamide ($HCONH_2$), and by mineral acids into chloral and ammonia salts, is considered by him to be in contradiction to what is known of the decomposition of chloral, and he thinks proof is required that the compound so described corresponds to the formula attributed to it or is identical with the chloralimide prepared by Pinner.—Ibid; from Pharm. Ztg., March 15, 1890, 166.

Uralium (Chloral-Urethan)—Solubility, etc.—D. B. Dott remarks that it is in some respects unfortunate that the name uralium has been given to chloral-urethan, as this name was originally applied by Guyard to a metal of the platinum group, and the termination of the word affords no indication of the nature of the compound. Uralium is not to be regarded as a loose molecular compound of chloral and urethan, but as an intimate atomic combination, differing in its physical properties both from chloral and urethan. For instance, it is almost insoluble in water, its two constituents being readily soluble, while its solution in alcohol possesses a taste which is markedly different from that of chloral or urethan. Although some excellent results have been obtained by its use as a hypnotic, its sparing solubility has militated against its employment. It is now found, however, that the substance is sufficiently soluble in proof spirit to admit of the ordinary dose (10 grains) being administered in less volume than is required for some of the other hypnotics, the dose of which is larger. Ten grains of uralium dissolve readily in 1 fluiddrachm of proof spirit. A solution of this strength must not be diluted with water, as such dilution very soon causes a crystallization of the dissolved substance. It is quite practicable to prepare a more dilute solution if desired, by using a larger proportion of spirit to begin with.—Pharm. Jour. and Trans., March 29, 1890, 793.

Sulphonal—Preparation.—The following are the details of the process for making sulphonal under the patent granted by the German government: 52 pounds of sodium ethylthiosulphate (produced by reacting upon sodium thiosulphate with ethyl chloride or bromide) are treated with ten pounds of acetone and about 100 pounds of alcoholic hydrochloric acid. After several hours' quiescence or gently warming, about 70 per cent. of the theoretical yield of mercaptol will have been formed. To this alcoholic solution water is added until all the mercaptol will have been thrown out of solution in the form of an oil, which latter is then oxidized to sulphonal by means of potassium permanganate. The rationale of the process is that the sodium ethylthiosulphate is split up in the presence of hydrochloric acid with the assumption of the elements of water, forming acid sodium sulphate and ethyl mercaptan. The resulting mercaptan is not separated, however, but is condensed at the moment of formation, in the presence of the acid, to mercaptol, which is less volatile and possesses a less abominable odor than mercaptan.—Amer. Drugg., Nov. 1889, 209.

Sulfonal—Reaction with Pure Reduced Iron.—According to Wefers-Bettink, sulfonal, if heated strongly with reduced iron in a test-tube, develops a garlicky odor, forming at the same time ferrous sulphide; after cooling, to the contents of the test-tube is added an excess of hydrochloric acid, which causes the evolution of hydrogen sulphide, recognizable by the odor or blackening of lead acetate paper. The sample of reduced iron should be tested for sulphide, as it often contains traces of it, for which allowance must be made.—Amer. Jour. Pharm., Nov. 1889, 563; from Apoth. Ztg., 1889, 1043.

Somnal—A New Hypnotic.—According to "Pharm. Ztg." (1889, 611), somnal, a new hypnotic, is made by the union of chloral, alcohol and urethane, and has the formula $C_{17}H_{2}Cl_{3}O_{8}N$. It melts at 42°, and does not react with silver nitrate, and is not acted upon by acids. It is administered according to the following prescription: Somnal, 10.0, distilled water 45.0, solution of licorice or raspberry syrup 20.0: in tablespoonful doses (containing 2 grams). One-half hour after its administration a sound sleep lasting from six to eight hours is produced, without the objectionable after-effects of chloral hydrate or urethane.—Amer. Jour. Pharm., Nov. 1889, 564.

Butylchloral—Administration.—Dr. Liebreich recommends the administration of butylchloral in neuralgia as follows: Butylchloral, 3–5 gm.; alcohol, 10 gm.; glycerin, 20 gm.; distilled water, 120 gm. Dose, a tablespoonful.—Amer. Jour. Pharm., April 1890, 172.

Formaldehyde—Poisonous Action upon Plant-Life.—Dr. Th. Bokorny observes that formaldehyde has become of particular interest since several important chemical relations have recently been developed and are in process of experiment. Thus Butlerow has endeavored the conversion of formaldehyde into sugar, and Loew has since so far succeeded not alone in transforming it into a sweet-tasting "formose," but, more recently, also into a "fermentable sugar," by simple manipulation. It is an interesting substance also in its relation to vegetable physiology, inasmuch as it is supposed to be a by-product of the most important of all chemical processes, that of assimilation. In green plants, according to v. Bayer's hypothesis, this daily process of assimilation results primarily in the reduction of carbonic acid to formaldehyde, and from this, by condensation, the production of carbohydrates—such as sugar, starch, etc. It seemed, therefore, of interest also to determine the action of formaldehyde upon living plants, and Dr. Bokorny details his experiments in this direction, the results of which show that formaldehyde exerts an intense poisonous action upon plant-life. Solutions of 1 : 1000 have the effect of killing plants in a short time, and poisonous action is manifested in solutions of 1 : 10,000. The author, however, observes that this observation need not necessarily conflict with v. Bayer's theory, since in the living plant its production and conversion into carbohydrates go possibly hand in hand.—Pharm. Rundschau, Dec. 1889, 295–297.

Vinyl-Alcohol—Constant Presence in Ethyl-Ether.—Th. Polleck and K. Thümmel, having made the observation in the course of their experiments upon *mercuric oxychlorides* (which see under "Inorganic Chemistry") that ethyl-ether, from every source, contained some foreign body that had the property of throwing mercuric monoxychloride from its solutions in alkaline carbonate, undertook a comprehensive series of experiments with the view to determine the nature of the foreign body as well as the composition of the amorphous mercuric precipitate that was produced in its presence. The results are summed up in a series of paragraphs, the essential points of which may be given briefly as follows:

1. Vinyl-alcohol is a constant component of commercial ethyl-ether.

2. It is produced together with peroxide of hydrogen during the preparation of the ether by the action of atmospheric oxygen, as well as by the action of peroxide of hydrogen, ozonized oxygen, or chromic acid upon the finished ether.

3. Vinyl-alcohol may be separated from the ether by repeated agitation with water, by treatment with alkaline solution of mercuric monoxychloride, by phenylhydrazin, by treatment with bromine, etc.

4. It may be obtained perfectly pure by fractioning the aqueous washings from ordinary ethyl ether.

5. The compound produced by the action of the vinyl-alcohol contained in ordinary ether upon mercuric monoxychloride is

Vinyl-mercuric oxychloride, from which the vinyl group cannot be separated in unchanged condition, polymerization taking place.

6. The yellow coloration or browning of commercial ether by potassium hydrate is due to vinyl-alcohol, while the separation of iodine from iodide of potassium is due, not to the vinyl-alcohol, but to the peroxide of hydrogen that is present with it in commercial ethyl-ether.—Arch. d. Pharm., Nov. 1889, 961–994.

Methyl Alcohol—Specific Gravity.—The following table of specific gravities is derived from a more extended table determined by W. Dittmar and Charles A. Fawsitts. The specific gravities are given on the basis of water at 4° C.

Per cent. CH_4O.	Specific gravity at 60° F.	Per cent. CH_4O.	Specific gravity at 60° F.
0 (pure water)	0.99907	90	0.82396
10	0.98262	91	0.82123
20	0.96808	92	0.81849
25	0.96093	93	0.81572
30	0.95355	94	0.81293
40	0.93697	95	0.81013
50	0.91855	96	0.80731
60	0.89798	97	0.80448
70	0.87487	98	0.80164
75	0.86290	99	0.79876
80	0.85035	100	0.79589
85	0.83738		

—Amer. Drugg., March 1890, 54; from Ztschr. f. Anal. Chem., 1890, 82.

Methyl Chloride—Method of Application as a Freezing Agent, etc.—W. Martindale describes a convenient little apparatus for holding chloride of methyl, which has been recently introduced into medical practice as a refrigerator. This apparatus consists of a "thermoisolator" made of a glass test-tube fused at the top to a larger surrounding tube after the interspace has been first rendered vacuous. The vacuum acting as a non-conductor, the methyl chloride may be kept in the jacketed test-tube for some time without undergoing the volatilization which takes place almost immediately when the liquid is released from pressure under ordinary conditions. It is thus rendered accessible for saturating tampons for direct application to any part of the body and for similar purposes, when it is not desired to apply the refrigerator as a spray.—Yearbook of Pharm., 1889, 403–404.

Propylic and Butylic Alcohols—Distinction.—According to the observation of H. Bornträger, normal propylic alcohol has the specific gravity

0.813, boils at 97°, is readily soluble in water, and if rubbed on the hands has a pleasant fruity smell. If its solution in 30 per cent. spirit is shaken with chloroform it is not taken up. Butylic alcohol (fermentation) has the specific gravity 0.805; it boils at 108–109°, dissolves with difficulty in water, floating on the surface like oil; it has an unpleasant oily fusel smell if rubbed in the hands, and is taken up by chloroform with increase of volume. If crude spirit diluted to 30 per cent. is shaken up with chloroform, amylic alcohol, acetal, aldehyd, and (fermentation) butylic alcohol are extracted, whilst ethylic alcohol, acetic acid, and tertiary butylic alcohol remain in the supernatant liquid.—Chem. News, April 18, 1890, 192: from Zeitsch. Analyt. Chem., 1889, No. 6, 670.

Phenols—Color Reactions.—The various colors obtained with phenols by use of a mixture of sulphuric and nitric acids, Paul Gutzkow attributes to the formation, first, of nitrous acid from the nitric acid and the behavior of nitrous acid towards the phenols. From a careful series of experiments he finds that, starting with nitrous acid, mere traces are sufficient for the production of characteristic colors. The method giving best results was to place in a watch crystal set upon a white background 10–15 drops of strong sulphuric acid, adding a small fragment of the solid phenol, or one drop of the solution, and, after waiting a few moments to allow the acid to cool, from a partly filled bottle of amyl nitrite, allowing the vapor to flow over the sulphuric acid for fifteen seconds; by gentle agitation the colors are developed in a short time.

Carbolic Acid yields, after an evanescent brown-red coloration, a deep blue-green solution, on standing for a time, or more quickly upon heating, changes to a pure blue. By the addition of an equal volume of water a blue or violet-red is obtained; if a portion of this diluted solution is agitated with ether, the latter will be colored yellow, and on evaporation and dissolving the residue in alcohol the addition of a single drop of an alkaline hydrate solution will give a blue color. The blue color may also be produced by pouring the diluted solution into an alkaline hydrate solution. Working carefully, one drop of a solution (1 :1000) gives a decided color.

Thymol gives about the same colors, with these differences: The blue color is more brilliant, and on dilution the coloring matter separates in flakes; by agitation with ether the color is completely extracted, coloring the ether a bluish-red.

Resorcin forms a deep blue solution, on addition of water a red-brown precipitate; agitated with ether the latter is colored yellow, leaving upon evaporation a red-brown residue in reflected light possessing a green metallic lustre; this residue, dissolved in alcohol, on addition of an alkaline hydrate, forms a violet solution with a beautiful brick-red fluorescence. If the original test be diluted and poured into an excess of alkali, the violet solution and red fluorescence can also be produced, and by agitation with ether-alcohol (1 : 1) the fluorescent principle will be found in the ethereal solution, while the aqueous solution will be of a pure blue color. This last test slightly modified serves as a delicate test for *nitric or nitrous acid.* To the 10–15 drops of strong sulphuric one drop of the solution containing either of the above acids is added (if an insoluble salt is to be tested it must be rubbed up with a little water and one drop of the mixture taken)-and, if possible, upon same spot where the drop was placed a few crystals of resorcin are dropped; if the quantity of the nitrate or nitrite was very small, instead of a blue, a brown-red color may be produced. The mixture is after a few minutes diluted with 2 c.c. water and, after cooling, poured into an excess of sodium hydrate solution (if a precipitate of sulphate is obtained this must be redissolved by addition of water); again allowing to cool, the solution is gently agitated with ether-alcohol, when the brick-red fluorescence will be found in the ethereal layer. This test succeeds with one drop of a solution of sodium nitrate (1 : 20,000) or with potassium nitrite (1 : 100,000).—Amer. Jour. Pharm., Nov. 1889, 565–566; from Pharm. Ztg., 1889, 560.

Phenols—Reactions with Chloroform and Alkalies.—According to G. A. Raupenstrauch, the colored reaction which occurs in the action of chloroform and the alkalies is characteristic for all phenols and phenoloid bodies, and does not, therefore, at once indicate the presence of any given body. The author boiled 2 c.c. of a solution of 1 part of a phenol in 1000 parts of chloroform in a test-tube with a fragment of caustic potassa and diluted to the margin of visibility. Carbolic acid gave a pale red tinge at 1 in 60,000; orthokresol a lilac at 1 : 80,000; meta-kresol more inclining to orange at the same dilution; thymol, a splendid purple red with a violet cast, 1 : 20,000; guaiacol, cherry-red with a blue cast passing into violet blue, 1 : 100,000; resorcin, 1 : 500,000; β-naphthol, prussian blue passing into green and brown up to 1 : 80,000; salol gives the same coloration as carbolic acid; betol the same as naphthol; potassium hydroxide gives more intense colors than sodium hydroxide. In many cases alcohol and ether prevent the reaction. For detecting the phenols in other bodies (the contents of the stomach, in medicines, blood, urine) the author acidulates with dilute sulphuric acid and distils in a current of steam. The first drops which pass over generally contain the phenol. It is shaken up in a parting funnel with 5 c.c. chloroform; the latter is separated from the watery liquid and heated with a fragment of potassa. If the liquid contains alcohol it is first rendered alkaline, the alcohol is distilled off, the residue is acidified, and treated as above. The reaction may be used for recognizing chloroform, chloral, or iodoform.—Chem. News, May 2, 1890, 217; from Bull. Soc. Pharm. Bord., through Ztschr. Anal. Chem., 1889, No. 6, 711–712.

Phenols—Definite Compounds with Camphor.—At a recent meeting of the Paris Society of Pharmacy (Feb. 12, 1890) Léger described some compounds of different phenols with camphor. After having considered them simple mixtures, he had changed his opinion, as he explained at a former meeting, and succeeded in proving they are real combinations—far from stable, it is true, yet combinations. The beta-naphthol and camphor combine in the proportion of 3 equivalents to 2; resorcin and camphor, 1 to 1; and alpha-naphthol 1 to 1 of camphor. The resorcin combination can be obtained in definite crystals; on the contrary, the naphthol combinations are liquid, and are purified by causing the excess of camphor to crystallize out by intense cold.—Chem. and Drugg., Feb. 15, 1890, 213.

Carbolic Acid—Proper Melting Point.—H. Helbing remarks, in reference to the melting-point given in the B. P. for carbolic acid—"not lower than 33° C."—that it would seem advisable to raise the minimum limit, it being a fact that many institutions actually use an acid with a higher melting-point. The attempt should at least be made to fix the melting-point as between 37° and 40° C., and the boiling-point between 182° and 184° C. —Chem. and Drugg., June 28, 1890, 867; from Helbing's "Record."

Carbolic Acid—Characters of the Synthetic Acid.—Carbolic acid is now prepared synthetically and supplied for chemical and medicinal use. It melts at 41–42° C. (the best commercial *pure* acid melts at 39.5°, the general melting-point being 35–37°), and boils at 178° C. (181° if the thermometer is completely immersed in the vapor). It is colorless, forms with water an absolutely clear solution, and differs most notably from the coal-tar acid by the purity of its odor, which is rather faint; a 5 per cent. aqueous solution is hardly recognizable by the odor.—Amer. Jour. Pharm., Nov. 1889, 563; from Pharm. Centralhalle, 1889, 535.

Carbolic Acid—Comparison of the Synthetical with the Natural Acid.—A. Schneider compared the ordinary and the synthetical carbolic acid in regard to the action of different substances probably causing the red coloration. Samples of the two acids were allowed to stand for three months with cork, wood, zinc, tin, iron, and lead; the synthetic acid had turned slightly yellow, while the coal-tar carbolic acid had assumed a more reddish-yellow color. Samples of synthetic acid, which were in contact with copper, assumed a bright red color in a few days, which remained constant during the time of the experiment. The acid from coal tar, similarly treated, also turned red and soon became a brown-colored liquid. In a mixture of ammonia and alcohol, the synthetic acid assumes the same blue color as the coal tar acid, although slower.—Amer. Jour. Pharm., April 1890, 176; from Pharm Centralh., 1890, 68.

Carbolic Acid—An Agent to Counteract the Effects of Bromine.—Sehrwald has found in carbolic acid an agent for counteracting the effects of bromine. Inhalations of phenol are stated to allay the pain resulting from the inhaling of bromine vapors. A 2 per cent. solution of phenol is beneficial in treating bromine burns on the skin.—Amer. Jour. Pharm., April 1890, 173; from Rundschau (Prag).

Phenol-Ethers—Action of Acid Chlorides.—H. C. C. Maisch studied the ketones resulting from the action of certain acid chlorides—acetyl-chloride and benzoyl chloride—upon a number of phenol-ethers—Anisol, Phenetol, Resorcindiethyl ether, *a*-Naphthylmethyl ether, *a*-Naphthylethyl ether, *β*-Naphylmethyl ether, and *β*-Naphthylethyl ether, and briefly describes these, as well as their oxidation products. The method for the preparation of these ketones was as follows: To a solution of 1 part of the phenol-ether and 2 parts acid chloride in 4 parts carbon bisulphide, 2 parts of finely powdered anhydrous aluminium chloride is gradually added. The latter is dissolved by the liquid until about one-half has been added, when a heavy oil falls to the bottom. The reaction is accompanied by a copious elimination of hydrochloric acid gas, which usually takes place without applying artificial heat; but should this not be the case, the flask is slightly warmed on a water-bath. As soon as all the aluminum chloride has been added the supernatent carbon bisulphide is poured off and, while cooling, the residue is decomposed by water. The liquid is acidified with hydrochloric acid in order to dissolve the precipitated basic aluminum compound and the ketone taken up with ether. This solution is then washed with water and a dilute alkaline solution until perfectly neutral, dried over anhydrous calcium chloride and the ether recovered. The residuary oil is subjected to fractional distillation, the colorless portion distilling above 200° C. is collected, brought into a freezing mixture, and the crystalline compound subjected to pressure between absorbent paper or plates. The further purification is accomplished by crystallization from ether, dilute alcohol or glacial acetic acid.—Amer. Jour. Pharm., Oct. 1889, 497–500.

Ortho-Phenol-Sulphuric Acid—Production.—To produce orthophenolsulphuric acid, S. Allain Le Cann allows to fall, drop by drop, pure refrigerated sulphuric acid into pure phenol, kept at —10°, stirring, and letting the mixture slowly take the ordinary temperature, and keeping the vessel covered in order to exclude the moisture of the air. In about eight days all the phenol is dissolved and the mixture is poured slowly into water, avoiding any rise of temperature. The sulphuric acid remaining free is determined and got rid of by neutralizing with barium carbonate. The barium sulphate is filtered off, and the filtrate is neutralized with pure potassium hydrocarbonate.—Chem. News, Aug. 23, 1889, 97; from Compt. rend., Aug. 5, 1889.

Phenylurethan—A New Antipyretic.—Prof. Giacomini draws attention to phenylurethan as an antipyretic, antirheumatic and analgesic. It is represented as being a compound belonging to the aromatic group, resulting from the combination of aniline with chlorocarbonic ethyl ether, and occurring as a white crystalline powder, insoluble in water and freely soluble in concentrated alcohol. Phenylurethan is claimed to act as an energetic and certain antipyretic, while at the same time exercising a beneficial influence on the general system. A dose of 0.5 gram is said to be equal to 1 gram of antipyrin, and to be sufficient to produce a fall in the temperature of from one to three degrees Celsius, lasting from nine to twelve hours. In acute and chronic articular rheumatism it is said to relieve the pain and reduce the swelling of the joints, for which purpose it is given in doses of 0.5 gram. As an analgesic it produces in some cases a favorable result, whilst in others the result is negative. The form recommended for its administration is as a solution in Marsala wine, which is said to prevent collapse, cyanosis and other unpleasant symptoms.—Pharm. Jour. and Trans., Dec. 1889, 501; from Pharm. Ztg., Dec. 4, 1889, 740.

Creasote—Preparation for Administration.—Dr. Bouchard uses the following formulæ: Creasote, 10 gm.; almond soap, pulv., 25 gm; make 100 pills; dose 1 every 2 hours daily until 8 or 10 have been taken. In giving creasote in large doses, the following formula is used: Creasote, 50 gm; cod-liver oil, q. s. to make 1 liter. Pour the oil gradually on to the creasote while stirring. A tablespoonful contains 75 cgm. of creasote, of which one or two may be given morning and night.—Amer. Jour. Pharm., Nov. 1889, 559; from Jour. de Pharm. et de Chim., Sept. 15, 1889.

Sodium Cresotinate—Therapeutic Value.—Sodium cresotinate, which as far back as 1876 was recommended as an antipyretic, appears to have fallen into discredit on account of the uncertainty of its action. As the compound used was probably a varying mixture of the sodium salts of the three isomeric acids derived from the corresponding cresol isomers, Professor Domme instituted some comparative therapeutic experiments with the separated compounds. He reports that only the paracresotinic acid is of use in medicine, the ortho- and meta-compounds proving one inactive and the other dangerous. Professor Loesch found that sodium paracresotinate is well tolerated by adults in quantities reaching to 6 or 8 grams daily. A part of the compound appears to pass unaltered into the urine, which then gives a violet color with ferric chloride. Administered to children it behaved as an active antipyretic in large doses, 1 gram having been given to a child twelve years old within three hours. It is further stated that good results have been obtained with the salt in the treatment of acute gastro-intestinal catarrh in children. Sodium paracresotinate is said to occur as a fine crystalline powder, with a distinctly bitter, but not disagreeable taste. It dissolves in 24 parts of warm water, from which it does not separate on cooling. The free acid crystallizes from aqueous solutions in long shining needles: it melts at 151° C. and sublimes undecomposed.—Pharm. Jour. and Trans., Feb. 1, 1890, 601; from Pharm. Ztg., Jan. 29, 1890, 68.

Guaiacol—Distinction from Creasote.—According to Dr. Karporo, *guaiacol* may be easily distinguished from *creasote* by the following test: 2.5 c.c. are dissolved in 25 c.c. 90 per cent. alcohol, and to 4 c.c. of this solution 10 c.c. pure sulphuric acid slowly added; *guaiacol* produces a red solution, the color of which is still persistent after several days; *creasote* produces only a brown color.—Pharm. Ztschr. f. Russl., 1889, 423.

Guaiacol—Use as a Vehicle for Creasote.—Dr. Bourget claims that by uniting guaiacol with creasote he is able to give considerable doses of the latter without causing gastric disturbance. In his "intensive" treatment of tuberculosis, he makes use of the following formula: Guaiacol, 7.50 gm.; tinct. cinchona, 20 gm.; Malaga wine, 1,000 gm. He commences by giving a tablespoonful of this (or 15 cgm. of guaiacol) with each meal. The dose is gradually increased to 3 tablespoonfuls, or until the patient is taking 1 gm. of guaiacol. The medicaments may be given in an enema composed as follows: Guaiacol, 2 gm.; oil of sweet almonds, 20 gm.; gum arabic, pulv., 10 gm.; emulsify, and add water, 950 gm.; to make 4 enemata. In winter, the wine of the first formula may be replaced by cod-liver oil. For the external treatment of tuberculosis, the author prescribes the following mixture to be applied on the chest, back, and arms, with friction: Creasote, 20 gm.; cod-liver oil, 200 gm.—Amer. Jour. Pharm., April, 1890, 181; from L'Union Pharm., Feb. 1890.

Guaiacol-Carboxylic Acid—A New Antiseptic and Antipyretic.—This compound, introduced as possessing extraordinary antiseptic and antipyretic properties, is said to be prepared by a patented process, which consists in saturating guaiacol sodium with carbonic dioxide under pressure in the cold and then heating the mixture, still in the closed vessel, to 100° C. The product is dissolved in water and decomposed with a mineral acid, when guaiacol-carboxylic acid crystallizes out in combination with two molecules of water. It melts in the anhydrous condition at 148° to 150° C., gives in solution a blue color with ferric chloride, and is decomposed by sufficient heat into carbonic dioxide and guaiacol—Pharm. Jour. and Trans., May 31, 1890, 977.

Annidalin (Di-iodphenol Iodide)—A Substitute for Iodoform.—A new substitute for iodoform is described by Messinger and Vortmann under the name of "annidalin." It is the di-iodphenol iodide ($C_6H_3I_2OI$), a compound apparently isomeric with tri-iodphenol, and is obtained by the authors by adding a solution of iodine in potassium iodide to an alkaline solution of phenol in the proportion of 8 mol. I to 1 mol. phenol and 4 mol. KHO. On heating the mixture to 50° or 60° C. a dark red amorphous precipitate is formed, becoming violet on drying. It is odorless, insoluble in water and dilute acids, soluble in alcohol, benzin and chloroform. Thymol, resorcin and salicylic acid form similar compounds.—West. Drugg., Oct. 1889, 374; from Berichte, Vol. 22.

Aristol—A New Iodized Phenol.—Dr. F. Goldman calls attention to a new iodized phenol, a combination of iodine and thymol, which has been placed upon the market under the trade name "Aristol." It differs from the "mono-iodo-thymol" of Willgeroth and Kornblum in containing the iodine in the hydroxyl instead of in the ring. Like the other iodized phenols it is obtained as a brownish-red voluminous body when a solution of the phenol (thymol in this case) in aqueous soda solution is added to a solution of iodine in iodide of potassium. It is, chemically speaking, the

Di-thymol-di-iodide, is insoluble in water, in alkaline solution and in glycerin, slightly soluble in alcohol, and easily in ether, from which it is precipitated by alcohol. It is also soluble in fixed oils. It must be protected from light and heat. It adheres well to the skin, wounds and burns, is not absorbed by the body, and is consequently not toxic, as iodoform is, for which it is proposed as a substitute. The percentage of iodine in this body is 45.8 per cent.—Pharm. Rec., April 7, 1890, 130; from Monatsheft. f. pract. Dermatol.

Pyrrol—Application as a Reagent for Certain Essential Oils.—Prof. A. Ihl recommends pyrrol as a delicate reagent for a class of essential oils which contain derivatives of allyl-benzol, as cinnamic aldehyde, eugenol, safrol and anethol. The most delicate reaction was obtained with *oil of cinnamon.* A very dilute alcoholic solution of this oil, to which a small quantity of an alcoholic pyrrol solution and then a little concentrated hydrochloric acid is added, produces first a yellowish-red color, changing rapidly to dark red, and finally produces a dark precipitate. Traces of cinnamon oil and of pyrrol can be identified by this test. *Oils of cloves and pimenta* in alcoholic solution, as above, give rise to beautiful carmine colorations. *Oil of sassafras* forms a beautiful rose-red coloration. The *oils of fennel*, *anise* and *star-anise* give only faint reactions—Chemiker Ztg., 1890, 438.

Iodol—Crystalline Form.—H. Helbing observes that iodol seems to be again attracting some attention, especially in the form of fine crystals, which has the advantage over amorphous iodol of not agglomerating when dusted on the mucous membrane.—Chem. and Drugg., June 28, 1890, 867; from Helbing's "Record."

Sozoiodol Salts—Characters and Reactions.—H. Trommsdorff gives some interesting information concerning the character and general reactions of sozoiodol salts. The potassium, sodium, lithium, zinc and mercury compounds of

Diiodparaphenolsulphonic Acid, which have been adopted to some extent in medical practice, are described as sozoiodolates.

Potassium Sozoiodolicum occurs as a fine white crystalline powder, which, upon being heated on platinum foil, puffs up in an extraordinary manner—resembling almost the so-called Pharaoh's serpents—and, at the same time, gives off a very disagreeable odor of iodophenol. It is insoluble in alcohol, but soluble to the extent of 1 per cent. in water at 15° C.

Sodium Sozoiodolicum occurs in white prismatic needles, with a taste at first astringent and then sweetish. It does not puff when heated on platinum. Water, glycerin and *warm* aqueous alcohol of 80 per cent. dissolve it to the extent of 5 per cent.

Lithium Sozoiodolicum appears in glancing white plates, which sometimes assume a faint yellowish tinge without affecting its purity. It dissolves easily in water and aqueous alcohol.

Zincum Sozoiodolicum crystallizes exactly like the sodium salt, in long white needles, which sometimes, when kept for a long time, assume a very faint reddish tinge. It does not puff up when heated, is soluble to the extent of 2 per cent. in cold water, 5 per cent. in warm water, and 10 per cent. in alcohol.

Hydrargyrum Sozoiodolicum appears in form of a deep citron-yellow, extremely fine and light powder, which is said to contain a constant proportion of 32 per cent. of mercury. Upon heating it puffs up like the potassium salt. It is practically insoluble both in water and in alcohol, but soluble to the extent of about 1.5 per cent. in water containing 5 per cent. of chloride of sodium. The

General Reactions of Sozoiodol Salts are given by the author as follows:

1. *Potassium Chlorate and Hydrochloric Acid.*—It is characteristic of all the sozoiodol salts that upon warming them in aqueous solution with potassium chlorate and hydrochloric acid chloranil (tetrachlorquinone) is formed, which separates in shining gold plates. As the odor of chloranil is very intense and definite, this reaction allows of the detection of sozoiodol, even when very much diluted. But since phenol and phenolsulphonic acid behave similarly, it is necessary also to test for iodine, which can be done by the following reaction:

2. *Nitric Acid* (1 : 4).—All sozoiodol salts, upon being warmed with nitric acid, give picric acid, which separates in yellow scales, and at the same time iodine vapor is evolved. The nitric acid should be in considerable excess and the heating continued until all the iodine is driven off.

3. *Sulphuric Acid.*—Upon heating the dry salt with concentrated sulphuric acid, iodine is immediately volatilized, and there is at the same time a formation of iodphenol, recognizable at once by its extremely disagreeable odor.

4. *Ferric Chloride Solution.*—All soluble sozoiodol salts give with a few drops of this solution an intense blue violet color, which after a time passes to red violet.

5. *Bromine Water.*—When bromine water is added to a soluble sozoiodol salt, iodine is set free and can be shaken out of the solution by means of carbon bisulphide.

6. *Barium Chloride Solution* (1 : 20).—All soluble sozoiodol salts give with this solution a strong white precipitate, which after a time changes into needles and consists of barium sozoiodolicum. It dissolves upon addition of ammonia even in the cold, and also in much hot water.

7. *Silver Nitrate Solution* (1 : 20) gives with the water-soluble sozoiodol salts a white microcrystalline precipitate of silver sozoiodol, which is also easily soluble in excess of ammonia.

8. All sozoiodol salts upon being heated give off the red violet vapor of iodine, sometimes with and sometimes without puffing up.—Pharm. Jour. and Trans., June 21, 1890, 1039–1040.

Glycerin—Vegetable and Animal.—J. G. Spenzer has examined some samples of glycerin from vegetable and from animal oils, with results as follows:

GLYCERIN.	VEGETABLE.			ANIMAL.	
	1	2	3	4	5
Specific gravity, 17.5° C.	1.2557	1.2556	1.2582	1.2525	1.2568
Absolute glycerol, 15° C.	97%	97%	98%	96%	98%
Formic acid	None.	None.	None.	None.	Very faint trace.
Butyric acid	"	"	"	"	"
Acrylic acid	Trace.	Trace.	"	"	Trace.
Higher fatty acids	None.	None.	"	"	"

In freedom from color, odor, metals, and adulterations, they conformed to the Pharmacopœia; all were neutral to litmus.

The results, as they are, are not entirely satisfactory, because of the limited number of samples, occasioned by the difficulty of finding a strictly animal glycerin; as it stands, the results are creditable to the animal glycerin, since it costs one-fifth the price, is sold in cans, and is therefore not of the same grade; a sample of the same grade was unobtainable. The author further remarks that it is difficult to see why a glycerin made from nice, clean tallow is not as good as that from vegetable oils, and is inclined to the opinion expressed by Wm. H. Clark (see Proceedings 1888, 506), that the glycerins from the two sources are equal in quality.—Amer. Drugg., July 1889, 128; from Proc. Ohio Pharm. Assoc., 1889.

Glycerin—Improved Method of Manufacture.—At the stearin works of De Milly, in France, the manufacture of glycerin is now conducted by the following process, which is simply the well-known process of "aqueous saponification," whereby the fat is decomposed into the fatty acids and glycerin, brought to a high state of perfection. The fats contained in closed boilers provided with stirrers, and mixed with a certain proportion of water, are treated with a current of superheated steam at a pressure of

15 atmospheres (225 lbs. to the square inch)—that is, at a temperature of 200° C. (392° F.)—being constantly kept in motion by the stirrer. The excess of steam passes out from the boiler, and finds its way, condensed to water (but still very hot), to spiral tubes contained in a tank filled with aqueous glycerin such as had been obtained in previous operations. By this method the heat remaining in the water of condensation is completely utilized, and the glycerin concentrated. At the same time the condensation of the steam in these spiral tubes constantly attracts a fresh supply of live steam from the steam-boiler. Between the latter and the fat-boiler a pressure regulator is interposed, and, as the steam-boiler is automatically fed to a constant level, the pressure in the fat-boiler is constantly maintained at 15 atmospheres.

After the separation of fatty acids and glycerin is completed, they are simply separated, the dilute glycerin passed on to the evaporating tanks, and the fatty acids are subjected to distillation. This is now conducted in a much more rapid manner than formerly by injecting into the receiver a jet of cold water under very high pressure, which acts as an aspirator for the vapors of the fatty acids, and at the same time instantly condenses the latter. A single retort can thus yield from seven to eight tons of perfectly white, distilled fatty acids in twenty-four hours. These are then passed on to the presses, where the different acids are separated, the stearic acid (in common parlance often called stearin, though this is chemically a compound of stearic acid and glyceryl) being, of course, the most important. —Amer. Drugg., March 1890, 53; from Zeitsch. f. ang. Chem., 1890, 39.

Glycerin—Purification.—Jos. Brunner proposes a process for the purification of glycerin which is based on the property of zinc oxide to unite with the nitrogenous substances and fatty acids that constitute the impurities of commercial crude glycerin. The author proposes to operate as follows: To 1000 parts of crude glycerin add 80 parts anhydrous zinc sulphate, heat, let cool, and when cold add 27 parts of caustic lime in powder. Filter under pressure.

The hydrated zinc oxide which is formed combines with the brown coloring matters and forms insoluble lakes, and insoluble basic salts with the fatty acids. The lime sulphate being almost insoluble in glycerin is almost entirely precipitated, and if absolutely pure glycerin is needed the little residue may be disposed of by passing a stream of carbonic acid through the filtrate and refiltering. The portion of zinc oxide remaining in the glycerin is disposed of by a stream of hydrogen sulphide.

Instead of zinc sulphate, the sulphates of magnesium, aluminium, iron, or copper may be used, and the quicklime may be replaced by carbonate of baryta.—Amer Drugg., June 1890, 115; from Monde Pharmaceutique.

Glycerin—A New Test.—Chas. A. Kohn, in the following qualitative test, has taken advantage of two characteristic reactions:

1. The formation of acrolein by the distillation of glycerin with acid potassium sulphate, according to the equation:

$$\underset{\text{Glycerin.}}{C_3H_5(OH)_3} = \underset{\text{Acrolein.}}{C_3H_3(OH)} + \underset{\text{Water.}}{2H_2O}$$

2. The red coloration produced in a solution of rosaniline, decolorized by means of sulphur dioxide, by acrolein, as by aldehydes (Schiff and Caro's reaction.)

To carry out the test, the solution containing the glycerin is evaporated down to about 5 to 10 c.c. in a small porcelain dish, about 1 Gm. of powdered acid potassium sulphate added, the whole well mixed together and then brought to dryness on the water-bath. The residue is transferred to a hard glass tube, 3 to 4 inches long, fitted with a cork and exit tube, the latter passing into a test tube containing water. On heating the tube the acrolein is readily evolved, and is dissolved by the water in the test tube. The contents of the latter can be tested for the presence of an aldehyde in the usual way by the addition of a few drops of Schiff's reagent. Both before and after the addition of the reagent, the solution in the test tube should be well shaken; the color only develops slowly, and reaches its maximum after fifteen to twenty minutes' standing. If the aqueous solution happens to have got warm by the condensation of steam evolved during the distillation, it must be cooled before adding the reagent, since the latter turns red on warming in the absence of an aldehyde.

The delicacy of the reaction has been tested by Mr. J. T. Conroy and Mr. B. W. Jones, with the result that it is possible to detect 0.15 gm. of glycerin in this way, or, in round numbers, 1 part of glycerin in 650 parts of water by evaporating down 10 c.c. of the solution, and, therefore, 1 part of glycerin in 6,500 parts of water by evaporating down 100 c.c.

The reaction is not given by any of the following substances: Mannite, cane-sugar, grape-sugar, milk-sugar, starch, dextrin, albumen, gelatin, stearic acid, and oleic acid; but the carbohydrates interfere with the delicacy of the test.—Amer. Drugg., May 1890, 93; from Jour. Soc. Chem. Ind.

Glycerin—Presence of Arsenic in Commercial Samples.—Attention having been recently called to the presence of arsenic in commercial glycerin (see Proceedings 1889, 634), L. Siebold has examined numerous samples of glycerin, but confining himself to the colorless and odorless samples, such as are likely to be used for pharmaceutical purposes. The majority of the samples tested proved to contain arsenious acid varying in proportion from 1 part in 4000 parts to 1 part in 6000. A few samples exceeded this proportion, and one contained as much as 1 part in 2500. Some samples that were found free from arsenic were traced all to one process of manufacture, viz., the steam distillation process, by which, as a rule, glycerin used for dispensing purposes is understood to be made. The process followed in testing, demonstrated by Mr. Siebold, is a modification of one recently recommended by Vulpius and Flückiger (see Proceedings 1889, 566), which depends upon the action of the gas given off by a mixture of the glycerin with zinc and very dilute hydrochloric acid in a test tube upon a paper cap that has been touched with a drop of a solution of mercuric chloride, a yellow spot being the result of the presence of minute traces of arsenic. A further observation by Mr. Siebold was consistent with arsenic being sometimes introduced into glycerin from the glass of the containing bottle, and it is proposed to further investigate this point.—Yearbook of Pharm., 1889, 416–425.

In a further note L. Siebold states that he has, since communicating the above paper on arsenic in glycerin, kept various kinds of bottles made of arsenical glass filled with perfectly pure glycerin, and has tested their contents from month to month at regular intervals. No contamination has taken place in any instance, though the glycerin has now been in contact with the glass ever since the beginning of September, 1889. He feels satisfied, therefore, that glycerin does not extract arsenic from glass bottles. He has likewise convinced himself that the solder of the tins in which glycerin is stored is not answerable for this contamination, and has little doubt that the latter is wholly referable to the use of impure acids, sulphuric or hydrochloric, in the manufacture of commercial glycerins.

With regard to the modification of Gutzeit's test for arsenic, which he recommended for the testing of glycerin, he points out a precaution he found necessary to observe in connection with the use of iodine solution for the destruction of sulphur compounds. Any excess of iodine retards the reaction, and if this excess should amount to more than a trace it may seriously interfere with the proper working of the test and lead to erroneous conclusions. He therefore suggests that a few drops of freshly-made mucilage of starch be added to the mixture of glycerin and dilute hydrochloric acid, and that an exceedingly weak solution of iodine (about 0.1 gram per litre) be then added drop by drop until the mixture shows a visible blue coloration. The mixture is then ready for the introduction of the zinc. In this way the destruction of sulphur compounds is completely attained without the risk attending the use of an appreciable excess of iodine, and the test, under these circumstances, is absolutely safe and trustworthy even in the hands of inexperienced manipulators. The purity of the reagents should, however, be ascertained by a blank experiment in every case.

The author has also satisfied himself that the test is admirably adapted for the purposes of a quantitative process, and that minute traces of arsenic may be estimated by it with greater ease and precision than by other methods. In a recent case in which there was a dispute as to whether or not a sample of glycerin sold as perfectly pure contained traces of arsenic, he was enabled by this process to demonstrate the presence of 1 part of arsenious acid in 48,000 to 50,000 parts of the sample, or 16 grains per cwt. of glycerin. He uses a solution of 1 c.c. of liquor arsenici hydrochloricus B. P. in a liter of water; and of this he makes additions of various proportions to definite weights of pure glycerin. All that is necessary is to ascertain which of these mixtures gives the same shade or depth of stain on the mercurial test-paper in exactly the same space of time and under exactly equal conditions, in all other respects, as the sample under examination. It is not advisable to work more than two tubes simultaneously, as otherwise it would be rather difficult to ensure absolute equality of conditions as to time. The treatment with iodine should be exactly the same as recommended above for qualitative purposes. Above all, it is necessary that the proportions of glycerin, dilute acid, and zinc, as well as the manner of preparing the test-paper, should be absolutely the same in both cases. With due attention to these details and a little practice, the test will be found as serviceable for the quantitative determination of these traces of arsenic as it is for their detection.—Pharm. Jour. and Trans., Feb. 22, 1890, 682.

Phosphoglycerites—Proposed Therapeutic Use.—Varenne proposes the phosphoglycerides of lime and soda to be tested in therapeutics. The soda salt is very soluble in water, and the lime salt dissolves readily if a small quantity of hydrochloric acid be added. The author does not give the formula for the present, having a doubt as to whether or not he has obtained chemical combinations in his mixture.—Amer. Jour. Pharm., Feb. 1890, 91; from Proc. Soc. de Pharm. de Paris, Nov. 6, 1889.

Resorcin—Test of Distinction from Carbolic or Salicylic Acid.—According to H. Bodde, if a few drops of solution of sodic hypochlorite is added to a watery or alcoholic solution of resorcin, a violet color, rapidly changing to yellow, is produced. On warming or adding excess of the reagent, the liquid gets dark brown. One part of resorcin dissolved in 10,000 parts of water will still show the reaction. Carbolic, salicylic, benzoic and other allied acids do not show the reaction, and at the most turn only slightly yellow on warming. Pyrocatechin, when treated with the reagent, turns a vanishing green; hydroquinone soon gets yellow or red. Another test is to first add a little liquor ammoniæ and then a few drops of the hypochlorite, when the liquid will give a reddish violet color, which changes green on boiling. The coloring matter is not taken up by benzol. The reaction is not shared by salicylic acid, benzoic acid or antifebrin. but carbolic acid thus treated turns a greenish blue, which is partly decomposed by benzol. The colors are changed to red by dilute sulphuric acid.—Amer. Jour. Pharm., Sept. 1889, 468; through "The Analyst"; from Nederl. Zydschr. v. Pharmacie.

Resorcin—A Sensitive Test for Nitrates.—The color reaction between resorcin and cocaine (which see) noticed by Goeldner has been tried by a number of German pharmacists and chemists, and the fact was disclosed that only one brand, which upon further investigation was proved to contain minute traces of nitrate as impurity, gave the characteristic blue color. The quantity of nitrate was so small that neither the indigo nor the ferrous sulphate test could be obtained, and Mr. Goeldner therefore discovered, instead of a new reaction for cocaine salts, a very sensitive reaction for nitrates, which is carried out as follows: If to a solution of 0.01 gm. resorcin in 6–7 drops concentrated sulphuric acid be added 0.02 gm. of the substance containing a nitrate, a beautiful blue color is obtained which increases in intensity.—Pharm. Ztg., 1889, 515.

Resorcin—A Remedy to Check Vomiting.—J. Andeer has noticed that chemically pure resorcin, unlike the impure resorcin which always causes vomiting, is the best of the remedies for checking vomiting, especially in disorders of the stomach. Other investigators have confirmed the accuracy of the above. It has also been used successfully as an antidote for various emetics.—Oesterr. Ztschr. f. Pharm., 1889, 649; from Ztschr. f. Therap.

Cholesterin—Occurrence in Cod-Liver Oil.—J. B. Nagelvoort noticed when analyzing some cod-liver oil, needle-shaped crystals mixed with small truncated crystals, in place of the usual glossy leaflets. The crystals gave the cholesterin reaction, with sulphuric acid becoming reddish-brown and changing on addition of water to a dirty green.—Amer. Jour. Pharm., Feb. 1890, 95; from Nieu Tijdschr. voor Pharm. Chem. en Toxikol., 1889, 305.

FIXED OILS.

Fixed Oils—Rate of Expansion—In the absence of data covering the laws of expansion governing fixed oils, Prof. W. T. Wenzell has made and records exhaustive experiments which prove that unlike all volatile oils and other liquids, the fixed oils examined by him have the same co-efficient of expansion, and that their rate of expansion is uniform for all degrees of heat from 62° F. to 112° F.—Pharm. Rec., May 5, 1890, 177–178; from Proc. Cal. Pharm. Soc.

Fats—Determination of Melting Point.—B. Kohlmann describes a new method for taking the melting point of fats, which may be briefly described to consist in filling a glass tube of small diameter with the fat by suction while in a fluid condition, closing the lower end with a suitable medium (sealing wax or the like) after having allowed it to congeal, then placing a heavy object upon the surface of the fat that will slip down the tube easily (a section of platinum wire) and subjecting the tube to the heat of an air-bath, a thermometer being immediately adjacent to the point in the tube at which the heavy object is placed. As soon as the melting point is reached, the heavy object sinks in the tube, and the temperature is read off on the thermometer. The paper is accompanied by illustrations showing the process.—Arch. d. Pharm., Sept. 2, 1889, 828–833.

Fixed Oils—Reactions with Silver Nitrate.—Raoul Brutté has determined the reactions of certain fixed oils with silver nitrate. He observes that if we treat 10 c.c. of an oil with 0.5 c.c. of fuming nitric acid in a porcelain capsule, and heat the mixture with brisk stirring until froth appears, different colorations are produced according to the oil used. The treatment is continued, adding 5 c.c. of a solution of silver nitrate at 2½ per cent. in alcohol at 90 per cent. If we continue heating, there comes a moment, about 115°, when the silver nitrate is suddenly decomposed and metallic silver is deposited. We continue heating so as to let the first reflections disappear, and we observe on the sides of the capsule the color of the thin, oily layer seen on inclining the capsule and the metallic reflections on the surface of the liquid. On saponifying the oils and treating them in the same manner we obtain quite different colors, as shown in the table:

1. IN THE NATURAL STATE.

Oil.	Oily Layer.	Reflection.
Olive.	Olive green.	Green.
Cotton.	Green.	Ash green.
Sesame.	Chrome green.	Light Sèvres blue.
Earthnut.	Yellowish green.	Emerald green.
Camelina.	Persian lake.	Light blue.
Linseed.	Dragon's blood.	Emerald green.
Colza.	Persian lake.	Cyprus green.

2. WHEN SAPONIFIED.

Oil.	Oily Layer.	Reflection.
Olive.	Mars orange.	Cyprus green.
Cotton.	Terra di Sienna.	Cobalt violet.
Sesame.	Gold yellow.	Cobalt violet.
Earthnut.	Persian lake.	Light violet.
Camelina.	Deep chrome.	Blue.
Linseed.	Black.	Green.
Colza.	Burnt carmine.	Ultramarine.

The names of the colors are those used by artists in water-colors.—Chem. News, Aug. 2, 1889, 62; from Compt. rend., July 15, 1889.

Fixed Oils—Detection of Mineral Oil in Admixture.—According to Dr. Holde the presence of mineral oil in fixed oils is tested for by taking a piece of potassium hydrate of the size of a pea and boiling in a test tube with 5 c.c. alcohol until solution is effected, adding 3 or 4 drops of the oil to be tested, boiling for a minute and adding from 3 to 4 c.c. water; if as little as one per cent. mineral oil is present a distinct turbidity is produced, larger quantities cause the turbidity to take place after the addition of only a few drops of water.—Apoth. Ztg., 1889, 751.

Non-Drying Oils—Composition.—The isolation of the fluid acids of the fixed oils being difficult and in some cases almost impossible, K. Hazura and A. Grüssner adopted a procedure in which the fluid fatty acids were first oxidized in alkaline solution with potassium permanganate and then the products of oxidation separated and examined. The products of oxidation of those acids found to compose the examined oils are here given:

Hypogæic acid, $C_{16}H_{30}O_2$, forms *dioxypalmitic acid*, $C_{16}H_{30}O_2(OH)_2$.

Oleic acid, $C_{18}H_{34}O$, forms *dioxystearic acid*, $C_{18}H_{34}O_2(OH)_2$.

Linoleic acid, $C_{18}H_{32}O$, forms *sativic acid*, $C_{18}H_{32}O_2(OH)_4$.

Arachis Oil.—The fluid fatty acids of this oil consist of linoleic and oleic acids and probably hypogæic acid. The oil obtained from different sources was found to contain varying quantities of hypogæic acid, so that this last named acid is at times difficult to isolate.

Almond Oil.—Thirty grams of the acids from this oil after oxidation were found to yield 3.8 gm. sativic acid and 18 gm. dioxystearic acid, indicating that the oleic acid is accompanied by a fair quantity of linoleic acid and to which is due the high iodine absorption of almond oil. It has always been stated that almond oil furnished the purest oleic acid, but the examination of other non-drying oils may reveal an oil free from the glyceride of linoleic acid.

Sesame Oil.—From 30 grams of the acids of this oil could be obtained 7 gm. sativic acid and 12 gm. dioxystearic acid; hence linoleic acid is present in larger amount than in almond oil.—Pharm. Post, 1889, 520 and 545.

Oleic Acid—Not Neutral in Reaction.—Dr. E. R. Squibb again calls attention to the fact that the description, in the U. S. P. 1880, of oleic acid as being "of a neutral reaction" is an error. To the contrary, it is never neutral to test paper, and while attention has been heretofore called to this, it seems to be periodically forgotten, and there is still complaint made, now and then, on the ground of its acid reaction.—Ephemeris, July 1889, 1244.

Oleic Acid—Detection of Linoleic Acid in the Commercial Article.—K. Hazura observes that commercial oleic acid is largely adulterated with *linoleic acid;* the presence of one per cent. can be detected by saponifying 50 gm. of the sample with alcoholic potassium hydrate solution, evaporating the alcohol, dissolving the soap in one liter water and thoroughly mixing the soap solution, which must be strongly alkaline, with one liter of a 5 per cent. potassium permanganate solution; after standing ½–1 hour the mixture is filtered, the filtrate acidulated with dilute H_2SO_4, and again filtered from the precipitate; this filtrate is neutralized with potassium hydrate, concentrated to about 300 c.c., acidulated with sulphuric acid and, at once, agitated with ether; if the precipitate is soluble in ether only azaleinic acid $C_9H_{16}O_4$ is present, formed by the oxidation of oleic acid, and the oleic acid was free from linoleic acid; if the precipitate is insoluble in ether it is removed by filtration, purified by recrystallization from alcohol or water in presence of animal charcoal and the melting point of the dried crystals determined; should this be above 160° linoleic acid was certainly present. As a control experiment the combining value of the crystals can be determined, which should approach 150.—Chem. Rep., 1889, 168.

Oleates—Preparation.—G. M. Beringer, after tracing the medical history of oleates, gives formulas for preparing a number of them. Respecting the proper kind of

Oleic Acid to be used for making them, he observes that authorities conflict as to the specific gravity. He finds the correct specific gravity to be 0.890 to 0.900, but that the oleic acid need not be chemically pure, purified "red oil" answering admirably for medicinal oleates.

Oleate of Zinc.—

Take of

Oleic acid	1,000 grains.	
Soda	160 "	or q. s.
Alcohol	6 fluidrachms.	
Zinc sulphate	550 grains.	
Water, a sufficient quantity.		

Warm the oleic acid in a capacious vessel on the water-bath to a temperature of 60° to 66° C. (140° to 150° F.), and having dissolved the soda in a mixture of the alcohol and two fluidounces of water, slowly add the soda solution, stirring constantly until the acid is entirely neutralized, and a small portion of the resulting soap dissolved in alcohol yields but a faint pink tint on the addition of a few drops of alcoholic solution of phenolphthaleine. Dissolve the resulting soap in three (3) pints of warm water and filter if necessary. Dissolve the zinc sulphate in one (1) pint of water and filter. Warm the solutions to 43° C. (110° F.), and slowly add the zinc sulphate solution, stirring constantly. Collect the precipitate on a moist filter, wash thoroughly with distilled water, and finally dry on bibulous paper at a temperature not exceeding 38° C. (100° F.) As thus obtained, oleate of zinc is a nearly white, impalpable, unctuous, slippery powder, fusible at 75° C., very soluble in ether, carbon bisulphide, chloroform, and benzol, somewhat less soluble in turpentine, petroleum ether and alcohol.

Oleate of Lead.—

Take of

Oleic acid	1,000 grains.	
Soda	160 "	or q. s.
Alcohol	6 fluidrachms.	
Lead acetate	675 grains.	
Water, a sufficient quantity.		

The oleic acid is saponified with the soda as in the process for oleate of zinc, 3 pints of warm water being added, and the filtrate precipitated with a filtered solution of the lead acetate in two pints of water (clarified if necessary by a few drops acetic acid). Oleate of lead thus prepared is a buff-colored firm mass, fusing at 65° C., forming an entirely clear liquid at 68° C., and is very soluble in carbon bisulphide, chloroform, ether, petroleum ether and benzol, and sparingly in turpentine and alcohol.

Oleate of Copper.—

Take of

Oleic acid	1,000 grains.	
Soda	160 "	or q. s.
Alcohol	6 fluidrachms.	
Copper sulphate	442 grains.	
Water, a sufficient quantity.		

Saponify the oleic acid as directed in the formula for zinc oleate, and dissolve the resulting soap in three (3) pints of water. Dissolve the copper sulphate in one pint of warm water and filter. Warm the solutions to about 140° to 150° F., and slowly add the copper solution to the oleate of soda solution, stirring constantly; warm until the copper oleate fuses into a mass, decant the clear supernatant liquid, wash several times with warm water, and finally dry on the water-bath. Oleate of copper, as thus produced, is a bright green waxy mass, melting at 49° C., very soluble in carbon bisulphide, chloroform, benzol, ether, turpentine, petroleum ether, absolute alcohol, alcohol, and fixed oils.

Oleate of Mercury.—

Take of

Oleic acid	1,000 grains.	
Potassa	220 "	or q. s.
Red oxide of mercury	383 "	
Nitric acid	323 "	or q. s.
Alcohol	6 fluidrachms.	
Water, a sufficient quantity.		

Saponify the oleic acid with the potassa as directed in the formula for zinc oleate, and dissolve the resulting soap in two pints of warm water and filter. Mix the nitric acid with the two fluidounces of water, heat to boiling, and add the mercuric oxide previously reduced to powder. Boil until it is entirely dissolved, adding, if necessary, a few drops of nitric acid additional. Dilute the solution of mercuric nitrate with four fluidounces of water. Warm both solutions to 66° C. (150° F.), and add the oleate of potassium solution to the mercury solution, stirring constantly. Decant the aqueous solution and wash the precipitate with warm water not exceeding 150° F. Oleate of mercury thus prepared is about the color of a very pale citrine ointment, and of somewhat softer consistency, fuses at 66° C. (150° F.), yielding an entirely clear fluid at 70° C. It is very soluble in carbon bisulphide, chloroform, ether and turpentine, and yields an opalescent solution in benzol and petroleum ether, and is slightly soluble in absolute alcohol and alcohol.

Bismuth Oleate.—This is the most difficult oleate to prepare by double decomposition, owing to the tendency of bismuth solutions to precipitate oxysalts. Hence the author prefers the following formula:

Take of

Bismuth oxide dried at 100° C. (212° F.) until it ceases to lose water	1 troy oz.
Oleic acid	3 troy oz. and 295 gr.
Water, a sufficient quantity.	

Rub the oxide of bismuth to a fine powder, and thoroughly mix it with the oleic acid in a capacious vessel, add two pints of water and boil the mixture, replacing the water as it evaporates, and stirring frequently until complete saponification has taken place and a small quantity of the mass dropped into cold water yields an ointment-like mass without any separation of oleic acid. Decant the water from the oleate, and work the mass with a horn or wooden spatula to free it from retained water. Bismuth oleate thus prepared is a cream-colored mass about the consistence of an ointment, softening at the temperature of the body and fusing at 58° C. It is easily decomposed by contact with metals, and is but very slightly soluble in the usual solvents for oleates.—Amer. Jour. Phar., Dec. 1889, 593–600.

Lycopodium-Oleic Acid (α-Decyl-β-isopropylacrylic Acid)—Distinction from Ordinary Oleic Acid.—See *Lycopodium*, under "Materia Medica."

Sulphoricinic Acid—Value as a Solvent.—Berlioz calls attention to the value of sulphoricinic acid as a vehicle for certain compounds when required for topical application. Naphthol, salol, creasote and carbolic acid all form with it solutions which give with water a perfect emulsion comparable to milk. In this way, without heat, 10 per cent. solutions of naphthol and carbolic acid can be made, which yield by simple dilution with water antiseptic liquids that have been found useful in the treatment of affections of the nasal cavities, the pharynx and the larynx.—Pharm. Jour. and Trans., Dec. 28, 1889, 502; from Jour. de Pharm. et de Chim., Dec. 15, 1889, 573.

Linoleic Acid—Invariable Presence in Vegetable Fats.—The investigation of R. Benedikt and K. Hazura establish the facts that the vegetable fats always contain linoleic acid, while the animal fats contain no fluid fatty acid other than oleic acid. For the physiologist these findings are interesting, if not important. A practical value is also indicated, namely, the identification of commercial oleic acids as derived from vegetable or animal sources. This is possible by isolating the products of oxidation with alkaline permanganate of potassium, linoleic acid giving rise to sativic acid; hence, if this latter acid is found the former acid is indicated, and with it the vegetable origin. For the preparation of a *pure* oleic acid only animal fats, as suet or lard, can be used—(Monatsh. der Chemie) Chem. Rpt., 1889, 216.

Olive Oils—Examination of Samples from Various Sources.—L. Archbutt examined 70 Spanish oils, 10 of which were adulterated, the percentage of free fatty acids varying from 25.1 per cent., the highest, to 1.5 per cent., the lowest, the average being 5.5 per cent. Of 29 Italian oils only one was adulterated. Fatty acids: highest, 25.2 per cent.; lowest, 0.9 per cent.; average, 8.5 per cent. Only 9 of 22 Sicilian oils were pure. Fatty acids: highest, 16.6 per cent.; lowest, 0.5; average, 9.1 per cent.—Amer. Jour. Pharm., Jan. 1890, 14; from Chem. Centralbl., 1889, II, 886.

Cotton-Seed Oil—Modification of the Nitrate of Silver Test for Its Presence.—Dr. T. Leone recommends the following modification of the well-known nitrate of silver test for the presence of cotton-seed oil in lard, for instance: As a test liquor he uses an alcoholic solution containing 1 per cent. of crystallized silver nitrate and one-half of 1 per cent. of nitric acid, which can be applied to solid fats as well as to oils. When a specimen of lard is to be tested, a few cubic centimetres of the fat are to be introduced into a test tube, about as much of the solution added, and the whole to be heated for five or six minutes on a water-bath. If the lard be adulterated a brownish-yellow ring will form at the point of contact of the two liquids; when no cotton-seed oil is present, no such coloration will take place. The same method is equally efficient for detecting the adulteration of olive oil with cotton-seed oil, only the test tube is to be kept ten to twelve minutes in the water-bath, after which the presence or absence of a brownish-yellow ring at the point of contact will indicate the presence or absence of adulteration. With pure oil a whitish ring is often observed, and, after prolonged heating, a greenish hue may develop. But the first, which is simply due to partial emulsion, and the second to chlorophyll, cannot be mistaken for the dark-yellow of cotton-seed oil. The test will clearly indicate, it is claimed, as little as 5 per cent. of the adulterant.—Chem. and Drugg., Aug. 3, 1889, 166.

Cotton-Seed Oil—Detection in Lard.—Dr. Thomas Taylor proposes a method for the detection of cotton-seed oil in lard, which is based upon the insolubility of the lard in cold petroleum benzine, in which cotton-seed oil is soluble, while both are dissolved by the hot fluid. Dissolve 140 grains of the suspected lard in 20 c.c. of petroleum benzin by the aid of heat, remove any animal tissues by passing the warm liquid through fine muslin, fill a test-tube with the solution and place it in ice water. In about twenty minutes the lard separates and may be removed from the solution of cotton-seed oil by filtration through paper. The filter is pressed between folds of bibulous paper, and the lard may then be removed from the paper with a palette knife and weighed. The cotton-seed oil is obtained by evaporation of the solution.—Pharm. Rec., April 21, 1890, 156; from Amer. Miscrosc. Monthly.

Cotton-Seed Oil—Detection in Lard.—S. S. Bradford proposes the following simple test for the presence of cotton-seed oil in lard, which is based on his observation, in 1870, that when solution of subacetate of lead is mixed with cotton seed oil a peculiar red color is always produced, and that this reaction is peculiar to cotton-seed oil. Two drachms of the suspected lard and two drachms of solution of subacetate of lead are placed in a test-tube, immersed in hot water, and allowed to stand until the contents are fluid. The tube is then well shaken and allowed to stand in hot water for ten minutes. It is then allowed to cool, when, upon the hardening of the lard, a red color is developed in presence of cotton-seed oil.—Pharm. Rec., Dec. 16, 1889, 383–384.

Oil of Sesame—Reactions and Detection in Olive Oil.—W. Bishop states that ol. sesame which has been exposed to air and sunlight for a few days gives a green color when shaken with hydrochloric acid 21–22° B. (sp. gr., 1.1670–1.1763). According to the author, 5–10 per cent. of sesame oil may be detected in olive oil by this method. The oil is exposed to the action of sunlight and air for a few days and then 6–8 c.c. of the oil shaken with 12–14 c.c. HCl of above strength in a stoppered flask holding about 35 c.c.—Amer. Jour. Pharm., Jan. 1890, 14; from Jour. de Pharm. et de Chim., 1889 (xxx.), 244–247.

Castor Oil—Examination.—According to Dr. H. Gilbert the specific gravity 0.950–0 970, the deposition of crystalline floccules at 0° C., the solubility in alcohol and glacial acetic acid, and the absence of a dark brown color if 3 parts castor oil be mixed with 3 parts carbon disulphide and 2 parts sulphuric acid, while sufficient to detect foreign vegetable oils, will not detect rosin oil, owing to similar behavior towards the above reagents. Rosin oil may be detected by saponification and agitation of the aqueous soap solution with ether, separating and evaporating the ethereal solution, when the rosin oil will be obtained. The behavior with nitric acid of specific gravity 1.31 is also of value. Castor oil is colored only slightly brown, while the acid solution remains colorless; in the presence of rosin oil the oily layer will be decidedly dark-colored (almost black) and the acid layer will be of a brownish color. A sample of castor oil examined contained about 19 per cent. rosin oil, and gave satisfactory results with the tests first mentioned.—Chemiker Ztg., 1889, 1428.

Castor Oil—Adulteration with Cocoanut and Cotton-seed Oils, and Methods of Detection.—Michael Conroy states that some shipments of castor oil have recently been received in Liverpool from Calcutta, numbering several hundred cases bearing the usual marks, which has been found on examination to be adulterated with cocoanut oil to the extent of from 20 to 30 per cent. The author, in search of a test for the presence of this oil, as well as for fixed oils used as adulterants in general, takes advantage of the behavior of castor oil to petroleum ether (benzolene). He finds that while, as is stated in text-books, castor-oil forms a clear solution with petroleum ether, it does so only at a temperature of 70° F. or above, and that at 60° F. a portion of petroleum ether separates out. If, however, the castor oil contains as little as 5 per cent. of a foreign fixed oil, no such separation takes place, and the mixture remains perfectly clear at 60° F. The insolubility of castor oil in larger quantities of petroleum ether—though according to the author's experiments not complete as stated in the text-books—is taken advantage of for a quantitative method of detecting foreign oils. He finds that if two volumes of petroleum ether be used instead of one, and thoroughly mixed by agitation at a temperature of 60° F., separation takes place in the adulterated as well as in the pure samples, and that the volume of the ethereal layer increases with the amount of adulterant present, with a corresponding diminution in the lower castor oil layer. He demonstrates this by the following mixtures:

No. 1. contains 20 c.c. of pure castor oil and 40 c.c. of petroleum ether.

No. 2. 20 c.c of castor oil containing 10 per cent. of cocoanut oil and 40 c.c. of petroleum ether.

No. 3. 20 c.c. of castor oil containing 20 per cent. of cocoanut oil and 40 c.c. of petroleum ether.

These, on being well mixed by agitation and allowed to rest, separate into portions varying with the amount of cocoanut oil present in the samples, as shown in the following table:—

	Bottom or castor oil layer.	Petroleum ether layer.	Total measurement.
No. 1	36 c.c.	24 c.c.	60 c.c.
No. 2	33½ c.c.	26½ c.c.	60 c.c.
No. 3	30½ c.c.	29½ c.c.	60 c.c.

No. 1 sample proves the author's contention that castor oil is not completely insoluble in petroleum ether. He had found in a previous experiment that in mixing 20 c.c. each of castor oil and petroleum ether, 37 c.c. of the castor oil mixture separates, whilst in this last experiment (No. 1 in table) only 36 c.c. of the castor oil mixture is left, showing that the extra 20 c.c. of petroleum ether has taken up some of the castor oil; and the decrease in Nos. 2 and 3 is undoubtedly due to the fact that the cocoanut oil is dissolved out by the petroleum ether. This can be demonstrated by drawing off the upper layer and driving off the petroleum ether, when the cocoanut oil containing some castor oil will be left.

It must be remembered in reading this table that the lower stratum is a mixture of castor oil and petroleum ether in nearly equal portions, and that the diminution in bulk in Nos. 2 and 3 is due not only to the abstraction of the cocoanut oil by the petroleum ether, but also to the fact that there is that much less castor oil in the sample to combine with the ether, so that the lower portion will show a decrease in volume from these two causes and the upper one a corresponding increase.

The presence of *cocoa-nut oil* in a sample may be established by heating the sample under examination in a small porcelain dish, when the distinctive odor of cocoa-nut oil can be readily ascertained. By this plan the presence of even 1 per cent. can be detected, and 5 per cent. is quite distinctive to any one possessing an ordinary sense of smell.

The presence of *cotton-seed oil* can be detected by the author's modification of the nitrate of silver test, which is applied as follows:

1. Make a test solution containing five parts of silver nitrate and one part of nitric acid (specific gravity 1.42) in one hundred parts of rectified spirit (specific gravity .838.)

2. Pour about 100 grains of the oil under examination into a dry test-tube, about half an inch in diameter, add to it 10 grain measures of the above test solution, and place the tube in *boiling* water for five minutes.

Castor oil assumes a pale yellow color, but the presence of cotton-seed oil causes it to become deep red.—Pharm. Jour. and Trans., Nov. 16, 1889, 385–387.

Sunflower Oil—Composition.—According to K. Hazura, sunflower oil consists chiefly of glycerides of linoleic and oleic acids; as the latter is present only in minute quantity, this oil furnishes the best material for the preparation and study of linoleic acid.—Arch. der Pharm., 1889, 654.

Oil of Maize—Yield and Characters.—Charles Edward Bowers has extracted the fixed oil from the seeds of maize, and found the yield to be largest when the grain had fully matured, namely, 3.16 per cent.; also, that the oil is contained exclusively in the germ of the corn, the amount yielded being 22 per cent. As obtained, the oil was of a pale yellow color, and had a somewhat thicker consistence than either cotton seed or olive oils. The odor was slight but peculiar; its taste not unpleasant, bland and oleaginous; its specific gravity .917. It is a fixed oil belonging to the group of non-drying, and is well adapted for lubricating purposes. It is soluble in all proportions in ether, bi-sulphide of carbon, chloroform, and benzin; very sparingly soluble in 95 per cent. alcohol, forming a milky mixture when shaken with that body, which separates, on standing, into two layers, both of which are perfectly transparent. The oil readily saponifies with so weak an alkali as lime-water, and with potassa or soda it forms a white soap. A thin layer of the oil exposed to the air for several weeks did not show any rancidity, and to all appearances remained unchanged. In this respect it compares favorably with the oils of rape seed, olive, etc. Pharmaceutically, it may satisfactorily replace cotton-seed oil, over which it possesses the advantage of being more easily absorbed by the skin. It is a by-product in the manufacture of starch, and has been to some extent introduced into commerce.—Amer. Jour. Pharm., Oct. 1889, 503–504.

Lard—Purification and Preservation.—James L. Demoville finds the alum process for purifying lard all that can be desired. The lard is melted, a little powdered alum being stirred in; then strained, cooled, and upon an inclined slab rubbed briskly with a muller, while a stream of water is allowed to trickle over it. Experiments for preserving the lard were made with benzoin, with balm of Gilead buds, storax, salicylic acid, turpentine and tolu. The best results were obtained by using one per cent. of balsam of tolu; the lard was white, kept well, and had its peculiar odor well masked by the slight but pleasant odor of the balsam.—Amer. Jour. Pharm., April 1890, 171.

Lard—Examination for the Presence of Cotton Oil.—Dr. A. von Asboth confirms the results of Muter and De Koningh's method of examining the above adulteration. This method is based upon the isolation of the fluid fatty acids and determining the iodine absorption of these acids. Three grams of the sample are saponified with alcoholic KOH and the neutralized solution (with acetic acid) is poured into a boiling mixture of 30 c.c. 10 per cent. lead acetate solution and 200 c.c. water, stirring constantly; the lead soap is thoroughly washed by decantation, and afterwards treated with 120 c.c. of ether. After standing 12 hours the mixture is filtered, the precipitate thoroughly washed with about 120 c.c. of ether, sufficient dilute HCl (1 : 4) added to make 250 c.c., and the mixture well agitated, until the lead salt is decomposed, when the aqueous liquid is removed, the ethereal solution washed until free from acidity and then diluted to 200 c.c. by addition of pure ether; 50 c.c. of this solution are freed from ether, 50 c.c. alcohol added and titrated with $\frac{n}{10}$ NaOH; 1 c.c. NaOH = 0.282 gram oleic acid. To determine the iodine absorption a quantity of the ethereal solution equal to 0.5 gm. oleic acid is evaporated at 50° C. in a current of CO_2, and 50 c.c. Hübl's reagent are added; after standing for 12 hours in the dark, 35 c.c. of a 10 per cent. potassium iodide solution are added, the mixture diluted to 250 c.c. with water, 15 c.c. chloroform added, and then titrated with $\frac{n}{10}$ sodium thiosulphate. At the same time 50 c.c. Hübl's reagent must be titrated with the thiosulphate; the difference between the two titrations gives the iodine absorbed by the fluid fatty acid taken and by calculating to 100 grams of the fluid acid the iodine absorption is found.

Pure lard yields 54 per cent. of liquid acid, with an iodine absorption of 94. Pure cotton-seed oil gives approximately 70 per cent. of liquid acid with an iodine absorption of 136. The method of calculation is as follows, A representing the iodine absorption of the sample, and B the percentage of oleic acid found:

$$\frac{A-94}{42} \times \frac{B}{70} = \text{percentage of adulteration.}$$

—Chem. Ztg., 1890, 93.

Oleo-Margarine—Determination in Butter.—Dr. Thos. Taylor recommends a method for the separation of oleo-margarine from butter, which is identical with that recommended by him for the determination of *cottonseed oil in lard* (which see), and is based, inversely, on the same solubility relations of the two substances: the butter being in this instance soluble in cold benzin as well as hot, while the oleo-margarine is deposited on the cooling of the solution.—Pharm. Rec., April 21, 1890, 156: from Amer. Microsc. Monthly.

CARBOHYDRATES.

Callose — A New Fundamental Vegetable Substance.— Louis Mangin describes a new fundamental vegetable substance which he has named "callose." He has not yet obtained this substance in a state of purity, so as to determine its composition. It is colorless, amorphous, insoluble in water, in alcohol, and in Schweitzer's reagent: very soluble in caustic alkali at 1 per cent., soluble in the cold in sulphuric acid, calcium chloride, and strong stannic chloride; insoluble in cold alkaline carbonates and ammonia, which gelatinize it. It is colored by aniline blue and rosolic acid and certain azo-colors.—Chem. News, April 18, 1890, 191; from Compt. rend., March 24, 1890.

Carbohydrates—Action upon Cuprammonium Solution.—C. L. Guignet has observed that cuprammonium sulphate yields no precipitates with gums, pectins and extractive matter, but gives blue precipitates, soluble in ammonia, with mannit, dulcit, glucose and galactose; while saccharose, lactose, invert sugar and levulose are not precipitated. Starch, starch-paste and inulin absorb cupric oxide from ammoniocupric oxide solution. —Amer. Jour. Pharm., April 1890, 178; from Compt. rend., cix., p. 528.

Collenchymatic Cork (or Suberized Collenchyme)—Occurrence in the Pericarp of Capsicum Fruit.—Hans Molish observes that directly beneath the external epidermis of the fruit of numerous varieties of *capsicum* is found a tissue of several tiers, which, from its appearance, must be, and thus far has been, regarded as collenchymatic parenchyma. Having for some time studied the histo-chemistry of capsicum fruit, the behavior of this tissue attracted particular attention, inasmuch as, notwithstanding the collenchymatic character of the cells, all reagents for cellulose gave negative results. He now records his researches made with the view to explain the anomalous character of this tissue, and arrives at the conclusion that it is cork collenchymatically developed. Such a tissue, combining the most important characteristics of collenchyme and cork, has thus far been unknown. He calls it *collenchymatic cork;* but it might also be properly named *suberized collenchyme*. Its appearance, the manner of thickening and the contents, correspond with parenchymatic collenchyme. For the cells, until their period of death, contain living plasma, nucleus, oil and red coloring matter becoming blue with concentrated sulphuric acid. But they differ from typical collenchyme in not directly giving the cellulose reaction. They further resemble collenchyme in not having the radial arrangement characteristic of cork cells.

The berries of other solanaceæ, like *Atropa Belladonna, Solanum nigrum* and *Solanum Lycopersicum*, do not contain collenchymatic cork. This, however, was found in *Solanum melongena* var. *coccinea*, where it is two to four cell-tiers thick, has a golden-yellow color, is decidedly collenchymatic, and, like the epidermal cells, suberized in a high degree. The yellow coloring matter of the cell membrane, on being treated with concentrated sulphuric acid, acquires a deep orange-red color.—Amer. Jour. Pharm., March 1890, 124–126; from Ber. d. D. Bot. Ges., 1889, 364.

Cellulose—Action of Water at High Temperatures and Pressure.—According to H. Tauss, pure cellulose gives traces of sugar at the ordinary pressure. At higher pressure the quantity of sugar increases, but at 20 atmospheres it is converted into hydrocellulose. Wood is attacked by water at the ordinary pressure, but the action reaches its maximum at 5 atmospheres, when beech wood loses 26.7 per cent. of its weight, of which 11 per cent. becomes sugar. There are also produced dextrins, precipitable by alcohol. No vanilline is obtained from the aqueous or ethereal extracts, or from the dried residues.—Chem. News, April 3, 1890, 169; from Monit. Scient., Quesn., Feb. 1890.

Cellulose—Quantitative Estimation.—Dr. G. Lange describes a quantitative method of estimating cellulose, which is simple and convenient, in that the crude material is taken without previous extraction with solvents. It is as follows: 10 grams of the material, with 3–4 times its weight of sodium or potassium hydrate and 30–40 c.c. water, are placed in a tubulated retort and heated in an oil-bath, the temperature of which is obtained by use of a thermometer, the bulb being in the same line with the bottom of the retort. When heated to about 140° C., effervescence commences, and the temperature is then slowly allowed to reach 180°; one hour's heating at this temperature is generally sufficient, the end of the reaction being noticed by the mass becoming dry. The retort removed from the oil-bath is allowed to cool to 80° C., warm water added, and the contents rinsed into a beaker; after cooling, the solution is acidified with dilute sulphuric acid, which causes the formation of a flocculent precipitate, containing the fine particles of cellulose which were suspended in the alkaline solution; by the careful addition of a dilute sodium hydrate solution an alkaline reaction is obtained, causing the precipitated substances, with the exception of the cellulose, to redissolve. The solution is filtered, by aid of a filter pump, through a very finely-perforated platinum cone, the precipitate thoroughly washed with hot and cold water, then again removed to the beaker, digested with alcohol, refiltered and washed with ether. The precipitate is dried in a water-bath, weighed, ignited, and the ash subtracted from the first weight, the difference giving the pure cellulose. This determination can be made in 5–6 hours, and the results are exact.—Ztschr. f. Physiol. Chem., 1890, 283.

Colloïdal Cellulose—Preparation and Characters.—C. E. Guignet prepares colloïdal cellulose as follows: Filter paper previously treated with hydrochloric and hydrofluoric acids, or carded cotton of the finest quality, is carefully dried and immersed in sulphuric acid of 50° B., care being taken to avoid a rise of temperature. The cellulose forms a transparent, gelatinous mass, which is not affected by contact with a large excess of acid, but is rapidly converted into dextrin at 100°. When the acid has been completely removed by washing, the colloïdal cellulose dissolves in pure water. In order to ensure complete removal of the acid, it is advisable to finish the washing with alcohol, and it is then dried at the lowest possible temperature. Colloïdal cellulose forms with water a slightly milky solution, which is readily filtered, deposits no precipitate even after several hours, and is not affected by boiling. It has an orange-yellow color, and is slightly dextrogyrate. Like all colloïds it is precipitated from solution by very small quantities of sulphuric or nitric acid, sodium chloride or sulphate, lead acetate, etc. Alcohol in sufficient quantity produces the same result. Colloïdal cellulose does not reduce Fehling's solution, gives no coloration with iodine, and differs from the achrodextrins in being precipitated by small quantities of salts. If a solution is dried on marble which has been rubbed with vaseline and well polished, it forms brilliant, semi-transparent pellicules, which swell up slightly in water and then dissolve. If immersed in sulphuric acid of 60° for a short time, or in acid of 55° for a longer time, it becomes insoluble in water, and at the same time a small quantity of dextrin is formed. When treated with nitric acid it forms nitrocellulose in the same way as ordinary cellulose, and becomes slightly less transparent.

Thin parchment-paper, which has probably been prepared with a somewhat weak acid, yields colloïdal cellulose to boiling water, but thicker paper, which has been treated with stronger acid, is insoluble. Parchment-paper may, in fact, be regarded as a cellular tissue, the pores of which have been filled up with colloïdal cellulose.—Amer. Jour. Pharm., Nov. 1889, 568–569; from Compt. rend. cviii., 1258–1259, through Jour. Chem. Soc., 1889, 847.

Cellulose Benzoates—Formation from Alkaline Cellulose.—The recent observation that the hydrated modifications of cellulose precipitated from solution either in the ammonia copper reagent, or in $ZnCl_2$.Aq. (50 per cent.), are soluble in strong solutions of sodium hydrate, affords, according to C. F. Cross and E. J. Bevan, a ready means of preparing benzoates of cellulose. By treatment of the alkaline solution with benzoic chloride (Baumann, *Ber.*, xix., 3218) these derivatives are formed and precipitated. They are soluble in glacial acetic acid. On adding water to the solution they are precipitated in voluminous white flocks. The analysis of these compounds by alkaline hydrolysis, and estimation of the benzoic acid by titration, has occasioned some difficulty, and the authors defer, for the present, any statements as to their composition. They are fusible at high temperatures; on continuing to heat, benzoic acid sublimes.—Chem. News, Feb. 21, 1890, 87.

Starch—Improved Process of Determination.—Asboth's method of precipitating gelatinized starch by barium hydrate in presence of alcohol has been repeatedly criticized as to its value in the examinations of cereals, inasmuch as Lintner's method of converting the starch into glucose by action of diastase and dilute acid always gave results which were 6–8 per cent. lower. Mr. Asboth has now studied the causes of the differences, and finds them due to the presence of fats or oils which, by containing free acids or easily decomposable glycerides, combine with the barium hydrate and thus increase the results for starch. This source of error is now removed by extracting the substance first with ether to remove fats, exposing the extracted substance to the air to remove the ether, and determining in one portion the moisture, in another portion the starch, as follows: About 1.5 gm. are gelatinized in a flask with 100 c.c. water; after cooling to the ordinary temperature, 50 c.c. barium hydrate solution added, thoroughly mixed by agitation, and then diluted with alcohol of 45 per cent. to make 250 c.c. After the precipitate has completely subsided 50 c.c. of the clear liquid representing 10 c.c. $Ba(OH)_2$ are removed with a pipette and in this the $Ba(OH)_2$ determined by titration with $\frac{1}{10}$ *n* hydrochloric acid, using phenolphthalein as the indicator. 10 c.c. of $Ba(OH)_2$ solution must also be titrated, and the difference, in c.c. $\frac{1}{10}$ *n* HCl between the two titrations multiplied by 0.162 will give the amount of starch in the weight taken; this figure must be re-calculated for the original fat-containing cereal.—Chem. Ztg., 1889, 591–611.

Saccharose—Solubility in Distilled Water.—Leon Serier has made determinations of the solubility of saccharose in distilled water. At a given temperature and a total volume of 100 c.c. of liquid, each gm. between 1 and 45 per cent. increases the densimetric expression of the solution by a constant value; from 45 to 90 per cent. (the maximum of solubility in the cold) the increase is less regular.—Chem. News, July 5, 1889, 11; from Compt. rend., June 11, 1889.

Sugar—Determination by Fermentation.—M. Jodlbauer has studied the conditions under which a definite relation is obtained between the quantity of sugar fermented and the weight of the carbonic acid formed. He concludes that under certain conditions the products of alcoholic fermentation are constant. These conditions are: the use of a powerfully developed yeast, which has undergone no loss of its tissues or of the protoplasmic contents of its cells by autofermentation; the preservation of a certain proportion between yeast and sugar (the yeast must not exceed 50 per cent. of the sugar); the exclusion of free oxygen, and the supply of a suitable nutritive substance. The best temperature is 34° and the most favorable concentration is 8 per cent. Of the products of fermentation carbonic acid admits of the easiest and most exact determination. Saccharose and anhydrous maltose yield 49.04 per cent. of carbonic acid, and dextrose 46.54 per cent. Saccharose requires twice as long a time for fermentation as maltose and dextrose.—Chem. News, Jan. 17, 1890, 38; from Dingl. Journal, 269, 73, through Ztschr. Anal. Chem., 1889, No. 5, 625.

Sugar—New Method of Its Estimation in Urine.—Jean Politis proposes the following new method for the estimation of sugar in urine, for which three solutions are required; a copper solution, a hyposulphite solution, and an iodine solution, the latter being used for establishing the titer of the hyposulphite solution:

I. *Copper Solution* ($\frac{1}{10}$ normal)—

Copper sulph., cryst	24.95 gm.
Tartrate of potass. and sod.	140 "
Soda, caust	25 "
Distilled water	to make 1,000 c.c.

II. *Solution of Sodium Hyposulphite* ($\frac{1}{10}$ normal)—

Sodium hyposulphite	24.8 gm.
Distilled water	to make 1,000 c.c.

III. *Iodine Solution* ($\frac{1}{10}$ normal)—

Iodine	12.7 gm.
Iodide potassium	18 "
Distilled water	to make 1,000 c.c.

Fifty c.c. of the alkaline copper solution are heated in a porcelain capsule to boiling, next 10 c.c. of the sugar solution or urine (containing about one-tenth per cent. of sugar) are added, the whole boiled for five minutes, then diluted with water to 100 c.c., and 50 c.c. of it filtered off.

The filtrate is slightly acidulated, a little excess of iodide of potassium added, and the iodine set free by the copper which had not been reduced determined by means of the one-tenth normal hyposulphite solution. The number of cubic centimetres of the latter used, deducted from 25, indicate the quantity which had been reduced by the 5 c.c. of sugar solution or urine (contained in the 50 c.c. of the filtrate).

Supposing the 50 c.c. of filtrate, obtained as above directed, had required—after the addition of iodide of potassium—11 c.c. of the hyposulphite solution to combine with the free iodine, this would be equivalent to 14 [25–11] c.c. of copper solution which had been reduced by the 50 c.c. of filtrate. Assuming the latter to contain 5 c.c. of diluted urine (1 in 5), then

1 c.c. of urine reduced 14 c.c. of the copper solution;
1 c.c. of the copper solution = 0.0036 glucose;
0.0036 × 14 = 0.0504; therefore
1 c.c. of urine contains 0.0504 glucose;
100 c.c. " contain 5.04 "

—Amer. Drugg., April 1890, 75; from Jour. de Phar. et de Chim.

Sugar—Estimation by Fehling's Solution.—In the estimation of sugar by Fehling's solution, H. Causse suggests the addition of 4 c.c. of a 5 per cent. solution of potassium ferrocyanide and 20 c.c. of water to each 10 c.c. of Fehling's solution employed. On running in the sugar solution to the boiling mixture, the potassium ferrocyanide dissolves the cuprous oxide as quickly as it is precipitated and forms a colorless solution, thus rendering the exact point of decolorization more easily seen, and preventing bumping. Potassium ferrocyanide appears to be without action on hot or cold Fehling's solution. On cooling the liquid obtained, after titration, it turns brown, and deposits colorless crystals, which the author intends to study.—Chem. and Drugg., Feb. 1, 1890, 154; from Jour. Chem. Soc.

Sugars—New Reagent.—Matthieu Plessy gives the following reagent for cane-sugar, grape-sugar, and pyrogallic acid: 54 pts. of ammonium nitrate are fused, and 34 pts. lead nitrate, and 21 pts. of plumbic hydrate are added. The reagent melts at 105° C., and with the substances named gives mixtures having in the presence of glucose a cherry-red, with cane-sugar a coffee colored, and with pyrogallic acid a chrome-green color.—Amer. Jour. Pharm., April 1890, 174; from Monit. Scientif., 1889, 1446.

Glucose—Determination in Presence of Invert Sugar.—A. Zimmerman finds that the ordinary reagents for glucose are also affected by invert sugar (dextrose or levulose), but that the following modification of Boettger's bismuth test is not affected by the latter, and is therefore applicable to the determination of glucose in the presence of invert sugar: Bismuth subnit., 2; Rochelle salt, 4; 10 per cent. sol. caustic soda, 100. Dissolve the Rochelle salt in the soda solution—which must be accurately 10 per cent.—then add the bismuth, allow to stand, and decant from sediment. When made from bismuth dried to constant weight, the solution may be used quantitatively, 1 c.c. being equal to 0.15 gram of anhydrous glucose and 0.165 gram of milk sugar.—Pharm. Rec., Jan. 6, 1889, 8.

Raffinose—Separation from Molasses and Saccharose.—According to L. Lindet the following successive operations are necessary for the separation of raffinose from molasses and saccharose:—(1) Purification and decoloration of the molasses by means of mercury sulphate, baryta, and methylic alcohol. (2) Dehydration of the methylic solution by means of lime at the boiling-point of methylic alcohol. (3) Precipitation of the methylic solution by ordinary alcohol. (4) Crystallization of the precipitate in ethyl alcohol at 80–85°.—Chem. News, May 2, 1890, 216; from Compt. rend., April 14, 1890.

Gallisine—A Non-Fermentable Ingredient of Commercial Glucose.—Dr. Schmidt finds that the glucose obtained by the action of non-arsenical sulphuric acid upon starchy matters is not pure, but contains a substance incapable of fermentation, gallisine. It is obtained as a very fine white powder, perfectly amorphous and very hygroscopic. It is insoluble in anhydrous ether, chloroform, and the hydrocarbons, except absolute alcohol (which dissolves it with difficulty), methylic alcohol, and glacial acetic acid. Its aqueous solution has a distinctly acid reaction. It is not precipitated by lead acetate and basic acetate, by mercury chloride and acetate, iron chloride, tincture of iodine, barium and calcium chloride. Its composition is represented by the formula $C_{12}H_{24}O_{10}$. The author has examined a number of derivatives, especially barium gallisate, hexacetylgallisine, potassium and lead gallisates. He has further studied the behavior of gallisine with chlorosulphonic acid and with bromine and when heated in a current of hydrogen: the products of the dry distillation of gallisine with lime, its oxidation by nitric acid, its transformation under the influence of the pancreatic secretion, its conversion into glucose, its behavior with the liquors of Fehling and of Knapp, and its optical properties. It is dextro-rotatory, the deflection ranging from 25.67° to 84.40°, according to the strength of the solution. In the analysis of eleven samples of commercial starch-sugar, the quantities of gallisine found were from 22.49 to 6.82 per cent.—Chem. News, March 14, 1890, 122; from Monit. Scient., Jan. 1890.

Quebrachit—A New Sugar from Quebracho Bark, which see under "Materia Medica."

Inosite—Occurrence in Urine.—Dr. Wm. S. Disbrow discusses the import of the presence of inosite (phaseomannite or muscle sugar) in urine, and points out:

1. That the greenish coloration and precipitate often found in the examination of urine for glucose by Fehling's solution and by some good authorities said to be due to this sugar, is now known to be open to a different interpretation.

2. The substance which gives this reaction has been shown to be inosite or muscle sugar, another of the same group of sugars which has been found in the human body under varied circumstances of health and disease.

3. The reduction of cupric oxide is necessary as a definite reaction for the determination of glucose, while this reaction never occurs in the presence of inosite.

4. The importance of the presence of glucose as an indicator of disease and the non-importance of inosite make it absolutely necessary that they should be differentiated at all times.—Pharm. Rec., Nov. 18, 1889, 349–350; from Med. and Surg. Reporter.

Sugar of Milk—Use as a Diuretic.—In a communication to the "Académie de Médecine, Prof. Germain Sée reports his researches concerning lactose, which he describes as the substance to which milk owes its power as a diuretic. He found that potions containing 100 gm. of lactose "produced an enormous diuresis such as cannot certainly be obtained with 4 or 5 liters of milk." He thought that in milk the action of lactose is obstructed by the presence of casein and fat. In cardiac cases, with dyspnœa, the lactose should be combined with iodide of potassium.—Amer. Jour. Pharm., Aug. 1889, 417; from Nouv. Rem.

Furfurol—Reactions with Certain Organic Compounds.—L. v. Udranzky has studied the color reactions of furfurol on a great number of substances. Among those which give colored reactions in presence of furfurol and sulphuric acid, some are colored in the same manner, whether treated with sulphuric acid alone or with this acid and furfurol. Other bodies are colored only when both reagents are employed, or at least the color which they give with sulphuric acid alone is not the same as that produced by the joint action of sulphuric acid and furfurol.

Acetacetic ether	Red.
Acetone	Light cherry-red.
Aniline	Bright red.
Anthracene	Greenish, then red, then blue.
Anthraquinone	Light red.
Atropine	Light rose.
Borneol	Peach-blossom, then violet, then blue.
Brucine	Light violet.
Cholesterin	Bright red and then blue.
Cinchonine	Light rose.
Coumarin	Light violet.
Dimethylaniline	Light rose.
Cresol	Light red, then violet, and then blue.
Ethylenic glycol	Bright raspberry-red.
Malic acid	Light rose.
Methylic alcohol	Light cherry-red.
Morphine	Raspberry-red, then bluish.
Naphthol *a*	Splendid violet.
Phenanthrene	Violet.
Phenol	Cherry-red, then blue.
Phenylhydrazine	Cherry-red.
Phloroglucine	Raspberry-red.
Protocatechuic acid	Violet, turning blue.
Pyrogallol	Bright cherry, then violet.
Quinic acid	Light violet.
Salicylic acid	Light rose-red.
Strychnine	Dirty violet.
Tyrosine	Faint rose-red.
Vanillic acid	Light rose-red.

The method of applying the reagents is as follows: A particle of the substance, if solid, or a drop if liquid, is put in a test-tube with 1 c.c. of water or alcohol, a drop of furfurol water at ½ per cent. is added, and about 1 c.c. of strong sulphuric acid is carefully let run in down the side of the tube. The bottom of the tube is kept in a current of cold water so that the temperature may not exceed 50°. In some cases, besides the coloration mentioned above, there is observed the formation of a green band. Some of the colored liquids present peculiarities if examined with the spectroscope. This is the case with naphthol *a*; if examined after agitation there is a narrow band, not well defined at equal distances, between D and E. After F the spectrum is obscured. With ethylenic glycol we see two very definite bands, a broader one at E and a narrower one at F.—Chem. News, Nov. 1889, 234; from Jour. de Pharm. et de Chim., Ser. 5, xx., No. 4.

ORGANIC ACIDS.

Oxamide and Oxamic Acid—Preparation.—Matthieu Plessy introduces oxalate of ammonia into fused nitrate of ammonia and maintains the mass at a heat of 338° to 347° F., for four hours. He thus obtains a compound which, taken up by water, yields 6½ per cent. of oxamide, and a quantity of oxamic acid corresponding to 54 per cent. of oxamate of baryta.—Amer. Jour. Pharm., Feb. 1890, 93; from J. de Phar. et de Chim., Nov. 15.

Lactic Acid—Quality, etc.—E. P. Boden, after giving the details of the manufacture of lactic acid, quotes the U. S. P. tests of identity and strength of the acid, and gives the results of the examination of six commercial samples, nearly all of which come up to the U. S. P. standard:

	SPECIFIC GRAVITY AT		
No.	15° C.	25° C.	Per Cent.
1.	1.204	1.196	72.
2.	1.217	1.204	75.
3.	1.214	1.201	76.85
4.	1.214	1.201	76.85
5.	1.215	1.202	76.98
6.	1.203	1.196	73.93

No. 1 contained traces of hydrochloric acid. No. 2 contained 5 per cent. of hydrochloric acid and traces of glycerin. The author draws attention to the fact that lactic acid is very hygroscopic and loses strength rapidly on exposure to air, attracting much moisture. He recommends the test of the "Ger. Pharm. Commission" for the presence of glycerin, which is as follows: Add one volume lactic acid drop by drop to two volumes ether; neither a transient nor a permanent opalescence should appear. The absence of oxalic acid is shown by the failure of calcium chloride to produce a precipitate. The remainder of the paper is devoted to the therapeutics of lactic acid, the statements, very contradictory, of various eminent authorities are quoted, and the author concludes by agreeing with Dr. Squibb's assertion that lactic acid is not an important therapeutic agent, and is gradually falling into disuse. In pharmacy the chief use of lactic acid is for the manufacture of lactates and lactophosphates.—Pharm. Era, Nov. 1889, 416; from Proc. Mich. Pharm. Assoc.

Benzoic Acid—Detection of the Synthetical Acid from Toluol Sold as Natural Acid.—G. and R. Fritz state that benzoic acid, prepared synthetically from toluol and sublimed from a small addition of gum benzoin, has been sold for some time as benzoic acid from benzoin. From its preparation such an acid always contains small quantities of chlorbenzoic acid, which impurity, and hence the source of the acid, can easily be ascertained if a little is ignited with potassium carbonate (free from chloride), extracting the residue with water, and testing for chloride by addition of silver nitrate and nitric acid.—Amer. Jour. Pharm., Nov. 1889, 562; from Rdsch., 1889, 840.

Mercuric Benzoate—Preparation.—E. Lieventhal makes mercuric benzoate by dissolving 125 parts mercuric oxide in 250 parts nitric acid, specific gravity 1.20, diluting with 4000 parts distilled water, and filtering; 188 parts sodium benzoate are dissolved in 4000 parts distilled water, the solution filtered and slowly added, with constant stirring, to the first solution; the bulky precipitate is collected on a linen strainer, thoroughly washed with cold water, expressed and dried. The product forms a light, white powder, slightly soluble in ether, alcohol, chloroform and water, but easily dissolves in water if half its weight of sodium chloride is added. This solution gives all of the reactions of mercuric salts, excepting the precipitation by albumen; to this behavior its use in subcutaneous injections is possibly due. Alcohol and ether poured over the powder cause it to assume a yellow color.—Pharm. Ztschr. f. Russl., 1889, 310.

Acetate of Lead—New Method of Manufacture.—H. Lowe has obtained a patent in Germany for manufacturing acetate of lead by the following process: The lead in the form of thin plates is exposed to the attacking influence of acetic acid containing 40 per cent. of nitric acid added to it. The decomposition is effected rapidly and with a slight evolution of heat; the vapors which rise from the vat in which the oxidation is being carried on are collected and led into a condenser—thus nothing is lost. Although nitric acid is employed, the solution obtained when the lead is all dissolved contains no nitrate of lead. On evaporating slowly, crystals of lead acetate are gradually thrown down. The expense of producing sugar of lead by this new method is asserted to be much less than by any other.—Amer. Drugg., Nov. 1889, 212; from Deutsch. Indust. Zeitung.

Trichloracetic Acid—Use as a Caustic in Nasal and Pharyngeal Diseases.—Trichloracetic acid, which has been known for some years and used here and there as an application to warts, corns, &c., has been exhaustively tried as a caustic in 140 cases, by Dr. Ehrmann. This observer prefers it to chromic acid, which has of late years been largely in vogue, especially in nasal and pharyngeal diseases. As an astringent he also found it serviceable in the following proportions: Iodine, 2 grs.; iodide of potassium, 3 grs.; trichloracetic acid, 5 grs.; glycerin to 1 oz.—Chem. and Drugg., April 26, 1890, 557.

Salicylic Acid—Examination for Homologous Acids.—B. Fischer examines salicylic acid for cresotic and other homologous acids by taking advantage of the low melting point of such a mixture. Three gm. of the acid are heated in a small flask with 15 c.c. water and 1–2 gm. pure calcium carbonate (free from iron); after effervescence ceases the solution, without filtration, is evaporated to 5 c.c., allowed to cool, diluted with a little water, and the solution poured off from the precipitate into a wide test tube, in which evaporation is continued until 1 c.c. remains; by stirring with a glass rod crystallization is hastened; after diluting with 1 c.c. water the solution is passed through absorbent cotton, and after concentrating again to 1 c.c. in a test tube the acids are precipitated by addition of HCl. If the original salicylic acid contained 3–5 per cent. of other acids, the precipitate obtained above will *melt* under hot water and form a *thick oily liquid* at the bottom of the test tube.—Pharm. Ztg., 1889, 329.

Salicylic Acid—Comparative Action of the Natural and the Artificial.—Some years ago, the late Mr. John Williams called attention to an impurity occurring in artificial salicylic acid (see Proceedings 1878, 536) which impurity was supposed to modify the action of salicylic acid unfavorably. If proved to be a well-defined crystalline compound, which Mr. Williams provisionally named cresylsalicylic acid. This observation has possibly some bearing on recent experiments as to the comparative action of natural and artificial salicylic acids and their salts by Dr. M. Charteris and W. Maclennan. From the symptoms observed the authors conclude that the samples of artificial salicylic acid and sodium salt used by them contained impurities, to which they attribute the restlessness, confusion, delirium, and greatly protracted prostration sometimes observed as following their use. —Pharm. Jour. and Trans., Dec. 28, 1889, 502; from Br. Med. Jour., Nov. 30, 1889, 1208.

Salicylic Acid—Behavior of its Solutions in a Mixture of Glycerin and Water.—Barnonoin states that the name of "solution" applied to the mixture of salicylic acid now in use, composed of salicylic acid 1 gm.; glycerin, 20 gm., and distilled water, 80 gm., is a misnomer, for an abundant precipitate is soon formed. He has sought to determine the proper amount of glycerin to be used from the point of view of the needs of practice, and has also endeavored to ascertain the exact quantity of water which it is possible to add to glyceric solutions. He found that 1 gm. of salicylic acid dissolved, with heat, in 50 gm. of glycerin, and gave no deposit on cooling. This degree of solubility is sufficient for many purposes, such as throat-collutories and other washes, which may be made as follows: Salicylic acid, 25 or 50 cgm.; glycerin (of 28° B.), 25 gm.; dissolve with heat. In using a more concentrated glycerin, stronger salicylic solutions may be obtained. With regard to the addition of water he found that 10 gm. of water added to a 1 to 50 glyceric solution of salicylic acid gave a precipitate. To solutions of 1 to 100, however, water may be added in all proportions.—Amer. Jour. Pharm., Jan. 1890, 18; from Répert. de Phar., Nov. 10, 1889.

Sodium Salicylate—Presence of Salicylic Acid in Excess.—R. Wright calls attention to an impurity observed in a sample of commercial sodium salicylate, which was not easily and completely soluble in cold water. An examination of the insoluble residue left no doubt that it consisted of salicylic acid.—Yearbook of Pharm., 1889, 511–513.

Salol—Solutions in Oils, etc.—At a meeting of the Paris Society of Pharmacy (Dec. 4, 1890) some preparations of salol were described under the names of "salol-santal," "salol-copaiba," and "salol-sweet-almond oil," such being solutions of salol in santal oil, copaiba and sweet almond oil respectively. Salol not only dissolves quite freely in these liquids, but also in oil of turpentine, the fixed oils, and liquid paraffin.—Amer. Jour. Pharm., March 1890, 133.

Salicylsulphonic Acid—A New Test for Albumen.—Roch recommends salicylsulphonic acid as a certain, delicate and convenient test for albumen. The albumen is said to be thrown down by the acid as a white powder, having an acid reaction and giving with ferric chloride an intense red color. The separation of albumen from a liquid is stated to be complete, 0.0005 gram in 10 c.c. being distinctly recognizable. In examining urine it is recommended to introduce a few crystals of the acid into a cubic centimetre of the liquid and shake, when the occurrence of turbidity may be taken as evidence of the presence of albumen, since the reaction is not affected by the presence of urea, uric acid, peptones, or glucose.—Pharm. Jour. and Trans., Nov. 30, 1889, 424; from Pharm. Centralh., Sept. 19, 1889, 549.

Sodium Salicylsulphonate—Antiseptic Value.—Dr. Zimmerli has experimented to determine the antiseptic powers of the acid sodium salicylsulphonate. This compound is represented by the formula $C_6H_3.OH.COOH.-SO_3Na$, and the idea was that as it contains, like salicylic acid, a free carboxyl group, it would retain its antiseptic properties, which are diminished in the case of the sodium salt of salicylic acid, whilst it would be more soluble than that acid. The results showed that in antiseptic properties the compound ranks below salicylic acid, but above sodium salicylate. Acid sodium salicylsulphonate is described as a white crystalline substance, odorless, acid to the taste, freely soluble in water, slightly soluble in alcohol and insoluble in ether, and giving an intense salicylic acid reaction with ferric chloride. Experiments with sodium α-oxynaphtholsulphonate showed that body to possess only slight anti-fermentative power, and it appeared to pass through the body undecomposed.—Pharm. Jour. and Trans., Nov. 30, 1889, 423; from Pharm. Ztg., Nov. 6, 1889, 675.

Di-iodosalicylic Acid—A New Antipyretic.—Dr. Calalb draws attention to di-iodosalicylic acid, which is represented by the formula $C_6H_2I_2OH.COOH$, and according to which it would be salicylic acid in which two atoms of hydrogen have been replaced by two atoms of iodine. It was introduced some time since as an antipyretic. Dr. Calalb has employed it successfully in polyarticular rheumatism, and he found it effectual when salicylic acid had failed. It possesses the further advantage in having analgesic and antithermic properties. The daily dose was 1.5 grams, increased in some cases to 4 grams daily.—Pharm. Jour. and Trans., Dec. 28, 1889, 502; from Nouv. Rém., Nov. 24, 1889, 595.

Dithio-Salicylic Acid—A Substitute for Salicylic Acid.—According to "Oestr. Zeitschr. f. Pharm." (1889, 298), dithio-salicylic acid, a proposed substitute for salicylic acid, is made by heating equal molecules of chloride of sulphur and salicylic acid to 120–150° C., dissolving the light yellow fusion in sodium hydrate, and precipitating the acid by addition of HCl as a resinous straw-colored mass, forming, after pulverization, a light yellow powder, easily soluble in alcohol, benzol and glacial acetic acid. Further, it is stated in "Apoth. Ztg." (1889, 679) that

Sodium dithio-salicylate is more potent than sodium salicylate, is used in smaller doses, and does not produce objectionable symptoms, as disarrangement of the stomach, possibly in consequence of its insolubility. It is used as an antipyretic, antiseptic and disinfectant.—Amer. Jour. Pharm., Aug. 1889, 411.

Dithiosalicylate of Soda—Characters and Uses.—Dr. Liederborn claims that this salt may advantageously replace the salicylate of soda in the treatment of acute articular rheumatism. There are two isomeric dithiosalicylic acids and two of its salts of soda; the writer recommends Salt II, which is the result of the combination of two atoms of sulphur with two molecules of salicylate of soda. It appears as a slightly gray, hygroscopic powder, soluble in water. Certain bacilli are destroyed by it more easily than by the salicylate of soda. The dose is 20 cgm. morning and night; it may be given oftener in severe cases. Nausea, ringing in the ears and transpirations occur when the dose is raised to 80 cgm. It is more energetic, in weaker doses, than is the salicylate of soda, and is easily borne by the stomach. The urine gives no coloration with the perchloride of iron.—Amer. Jour. Pharm., Nov. 1889, 560; from Rep. de Pharm., Sept. 10, 1889.

Cresyl-Salicylic Ethers—Antiseptic Action.—Dr. Zimmerli has experimented to determine the antiseptic action of the cresyl-salicylic ethers, in the expectation that they might prove more powerful than "salol," which is a phenyl ether of salicylic acid. The three isomeric cresyl ethers, ortho, meta, and para, are described as white crystalline bodies, resembling salol in appearance, insoluble in water, but freely soluble in alcohol, the solution giving with ferric chloride an intense violet color. The results obtained seemed to show that all three cresyl compounds possess certain antifermentative properties, in that they act as deodorants and possess the property of preventing the multiplication of bacteria by the ordinary process of division; but on the other hand the microbes are not killed, the influence being only inhibitory, like that of salol. Compared with salol they are weaker in their action. The meta compound is said to occur as a fine powder, suitable as a dusting powder.—Pharm. Jour. and Trans., Nov. 30, 1889, 424; from Pharm. Ztg., Nov. 6, 1889, 675.

Phenylpropionic Acid—Usefulness in the Treatment of Phthisical Patients.—Dr. C. T. Williams has found phenylpropionic acid ($C_9H_{10}O_2$) to be useful in the treatment of phthisical patients. The acid is insoluble in water, but dissolves in six parts of alcohol. From ten to twenty minims of this saturated solution, diluted with from one to two ounces of water, were given three times a day.—Amer. Jour. Pharm., Aug. 1889, 397; from "Practitioner."

Citric Acid—Separation from Malic Acid in Presence of other Organic Substances.—Edo Claassen, in his determination of citric acid as a constituent of the leaves of *Cephalanthus occidentalis* (which see under "Materia Medica"), found that the usual method for the determination of this acid, in presence of malic acid and considerable quantities of other organic substances, required modification, which he summarizes as follows:

1. The separation of citric acid from malic acid by treating their well-dried magnesium compound with cold water is unreliable, at least in presence of appreciable quantities of organic substances, because the citrate, in his experience, remains in solution, which should only contain malate.

2. The separation of the two acids by treatment of their ammonium compounds with absolute alcohol should yield good results if, as is stated, the malate is easily soluble under these conditions.

3. If solution of ammonium citrate is treated with ammonium in excess, then with calcium chloride and a sufficient quantity of alcohol, a precipitate forms, which, when dissolved in excess of hydrochloric acid, treated with ammonium in excess, and boiled, yields as a precipitate all of the citric acid in the form of a heavy, white powder as calcium citrate. To insure accuracy the filtrate, from which the latter has been separated, should be boiled a second time, this being particularly necessary in case of slow filtration.—Pharm. Rundschau, Jan. 1890, 12–13.

Citric Acid—Determination in Vegetable Substances.—In a further communication (Ibid, March 1890, 59–60) the author recommends the following method for determining citric acid in vegetable substances: The substance is extracted with water containing ammonia or ammonium carbonate, the liquid evaporated, precipitated with lead acetate, the dried precipitate extracted with boiling strong alcohol, suspended in water, decomposed with HS, filtered, and the filtrate evaporated to thin syrupy consistence. To the syrup ammonium chloride is then added, followed by chloride of calcium, ammonia in excess, and three times its volume of alcohol. The precipitate is now washed completely in a mixture of 3 volumes of alcohol and 1 volume of water, the alcohol evaporated from it. It is then dissolved in hot diluted HCl, the solution filtered, allowed to cool, ammonia added in excess, again filtered, and evaporated to dryness. The completely dry substance is now treated with boiling ammoniacal water, the mixture transferred to a tared filter, and the filter washed with hot water; the filtrate, however, is again evaporated to dryness, and the residue treated as before, so that any insoluble portion resulting may be collected in the same filter, the entire contents of it being weighed as "calcium citrate" with the usual precautions. In case that the calcium citrate is not sufficiently pure, the entire process—beginning with the solution in dilute HCl—must be repeated. In a third article (Ibid., May 1890, 107–108) the author communicates some further details respecting the isolation of citric acid, in presence of malic acid, from various fruits, citing the cranberry as an example.

Ferri et Ammonii Citras—Cause of Instability of its Solutions.—B. S. Proctor, having observed aqueous solutions of ammonio-ferric citrate to gradually form deposits, was led to investigate the cause. He observed that on incinerating the compound the residue of incineration gave off the odor of sulphuretted hydrogen upon the addition of hydrochloric acid, and the presence of sulphate in the original citrate was confirmed by the barium test. A suggestion that a manufacturer's modification of the official process for citrate of iron and ammonium, in precipitating the ferric hydrate with caustic soda and the use of hard water, might have introduced a trace of sulphate, was negatived by the fact that a sample in the preparation of which the ferric hydrate was known to have been precipitated by ammonia, gave palpable quantities of sulphate and only traces of lime. Mr. Proctor himself refers the contamination, which in some cases equalled 2 per cent. of sulphuric anhydride, to the conditions under which the citrate is manufactured on the large scale. It is known that when ferric hydrate is precipitated from the sulphate it will contain a notable quantity of basic sulphate, unless the caustic alkali used in the precipitation is kept continually in free excess. But when a large stream of iron liquor is poured into alkali this condition is not present, since the liquid immediately surrounding the point of impact will always contain iron in excess of alkali for a sufficiently long time to allow of the formation of basic sulphate, which may escape decomposition even after the mixture becomes more complete. The remedy suggested is to allow the two solutions to mingle in thin streams so regulated that the correct equivalent proportions are pretty closely maintained.—Yearbook of Pharm., 1889, 373–380.

Phospho-Citrate of Iron—Preparation in Crystalline Conditions.—Lecerf describes phospho-citrate of iron as a greenish-white *crystalline* powder, soluble in cold water, very soluble in warm water, and insoluble in alcohol. It oxidizes in the air, taking on a brown color which gradually deepens. In making it, a solution of ferrous sulphate is precipitated by an excess of ammonia phosphate; the precipitate, carefully washed, is allowed to macerate for five days at a temperature of 104° in a concentrated solution of citrate of ammonia. This solution is decanted repeatedly until it becomes nearly colorless and the precipitate has become white. The latter is then rapidly washed with distilled water, and afterward with alcohol, and is dried under protection from the air.—Amer. Jour. Pharm., Nov. 1889, 560; from Proc. Congrès de Thérap.

Tartaric Acid—Reduction.—Ballo observes that neither Liebig's nor Baeyer's theory of the formation of sugar in plants gives any explanation of the part played by the iron which is present in chlorophyll. In investigating the action of this metal on vegetable acids, the author found that tartaric acid, when warmed with ferrous sulphate, is converted into an acid which he names isoarabinic acid, on account of the sticky nature of solutions of the calcium salt. Tartaric acid, 1 part, and ferrous sulphate, 1 part, are dissolved in water, about 2 parts, and the solution warmed on the water-bath; after a short time a greenish-yellow precipitate, consisting chiefly of the iron salt of an acid containing more oxygen than isoarabinic acid, is formed. The whole is then evaporated with constant stirring, until the residue solidifies on cooling, and is then extracted with strong alcohol. The alcohol is evaporated, the residue dissolved in water, the solution neutralized with milk of lime, filtered, evaporated to a syrup, and the calcium salt which separates dissolved in water and decomposed with the calculated quantity of oxalic acid. The filtered solution is concentrated, mixed with alcohol, separated from any undecomposed salt, and again concentrated and mixed with alcohol and ether. After keeping for a long time, a crystalline compound, which the author names *isoarabinic acid hydrate*, separates, and the filtered solution, on evaporation, yields isoarabinic acid.

Isoarabinic acid, $C_6H_{10}O_5$, is a thick, almost colorless syrup, which is miscible with water in all proportions, and when burnt gives off a smell of burnt sugar. It is dextro-rotatory, and its specific rotatory power is $[a]_D = +20°$, but it does not reduce Fehling's solution. The *potassium* salt, $C_6H_9O_5K$, is anhydrous, and crystallizes well. The *calcium* salt $(C_6H_9O_5)_2Ca+9H_2O$, dissolves in water, forming a sticky solution, from which it crystallizes moderately easily; it loses some of its water at 100—120°, the remainder only at a temperature so high (above 140°) that the salt is partially decomposed. It reduces ammoniacal silver solution, and readily decomposes both in solution and in the dry state, being converted into a basic salt, $(C_6H_9O_5)_2Ca,CaO+8H_2O$. The latter is a colorless powder, and is insoluble in water, but it dissolves in potash, and is reprecipitated on boiling the solution; it reduces ammoniacal silver solution. When a solution of calcium salt is mixed with a solution of lead acetate, a yellow precipitate, consisting principally of the salt, $(C_6H_9O_5)_2Pb$, is formed, and a colorless substance, consisting principally of the basic salt, $(C_6H_9O_5)_2Pb,2PbO$, separates from the filtrate after some time.

Isoarabinic acid hydrate has probably the composition $C_6H_{12}O_6$; it does not reduce Fehling's solution.

These results show that substances isomeric with the carbohydrates, and other compounds richer in oxygen, are formed by the action of ferrous sulphate on tartaric acid. The quantity of ferrous sulphate employed may be as little as one-tenth the weight of the tartaric acid without influencing the results, but the author believes that direct sunlight may have some appreciable effect on the reaction. These facts are evidence in favor of Liebig's theory of the formation of sugar in plants. It was frequently observed that the crude solutions of isoarabinic acid contain reducing substances which, however, disappeared on further investigation; this fact seems to indicate that it is possible to obtain sugar synthetically from tartaric acid or other vegetable acids.—Jour. Chem. Soc., July 1889, 693; from Ber. d. D. Chem. Ges., xxii., 750–754.

Tartaric Acid—Melting Point and Ash of Commercial Samples.—Fred. H. Smith observes that the melting point of tartaric acid is variously given at 135° C. and 170° to 180° C. He has determined the melting point of seven different commercial samples, using a corrected Yale thermometer, and obtained the following results:

	A	B	C	D	E	F	G Crystals.
Melting Point,	162.8°	163.5°	159.1°	163.5°	163.5°	167.5°	162.

It was thought that possibly the variation in the melting points might in some respect be due to adhering moisture. Consequently a number of the samples were dried at a temperature between 80° and 90° C. for about an hour, the amount of loss, however, was not over .005 to nearly 5 gm. of the acid. After drying, the melting points were again determined, but did not vary perceptibly from the first determinations. One of the samples was recrystallized, both from water and alcohol, and then carefully dried, but no change in the melting points was noticed.

The author, furthermore, determined the amount of ash in these several samples, with the following results:

	A	B	C	D	E	F	G Crystals.
Per cent. of ash . .	0.04	0.12	0.111	0.04	0.02	0.12	0.04

The ash left was examined and found to consist almost entirely of calcium sulphate, without evidence of copper or other metallic salts. The Pharmacopœia states that on ignition not more than 0.05 per cent. of ash should remain.—Amer. Jour. Pharm., April 1890, 164–165.

Potassium Bitartrate—Proposed Use as Standard for Acidimetric and Alkalimetric Solutions.—Heinrich Heidenhain observes that it is remarkable that the acid tartrate of potassium has hitherto not been proposed as the standard for adjusting volumetric acid and alkaline solutions, since it possesses properties that make it eminently suitable for this purpose. Crystallizing in an anhydrous condition, it may be dried completely at comparatively high temperatures without suffering change, and it is, moreover, practically non-hygroscopic; it constitutes an easily weighable substance, which may be kept in an unchanged condition indefinitely, and when subjected to titration with phenolphthalein as indicator the end-reaction—indicated by a faint rose color—is exceedingly sharp, and at the same time absolutely correct, as the author shows by his recorded experiments. After giving the method for preparing the acid bitartrate of potassium in a pure condition, suitable for the purposes named, the author illustrates the method of its application in the following example:

If, for instance, a one-fifth normal alkali solution is required, 1.88 gram of the bitartrate is weighed upon a watch-glass, transferred to a porcelain capsule, and a solution of the alkali, somewhat stronger than is finally contemplated, is allowed to flow into the capsule in quantity insufficient to complete saturation (to within about 2 per cent. of the acid tartrate used); a drop of a 1 per cent. alcoholic solution of phenolphthalein is then added, and the mixture is heated over an open flame to boiling, active ebullition being continued for about a minute, when the addition of alkali solution is continued drop by drop, until the change to faint rose-red takes place. The experiment is then repeated with a second portion of the acid bitartrate, and if the two are concordant the results will indicate the degree of dilution necessary by simple calculation, in the usual manner. After the dilution has been made, the test must be repeated with the finished volumetric solution. This solution, in its turn, may then, as is obvious, be used to establish the titre of the acid volumetric solutions.—Pharm. Rundschau, June 1890, 133–134.

Cream of Tartar—Examination of Italian Samples.—H. Broadbent reports the results of the examination of six samples of Italian cream of tartar, as follows:

	Pot. Bi-tart.	Pot. Tart.	Cal. Tart.	Insol.	Moisture.
Sample 1.	94.73	.74	3.99	.29	.45
" 2.	94.08	1.56	3.88	.24	.33
" 3.	93.49	1.63	4.52	.16	.29
" 4.	95.44	.29	3.90	.27	.20
" 5.	93.40	2.98	3.51	.30	.02
" 6.	93.52	1.94	4.32	.12	.32
From which we get an average of	94.11	1.52	4.02	.23	.27

These results, owing to their slight variations, are very satisfactory, and reflect great credit upon the manufacturers. The calcium tartrate is remarkably uniform, only varying from 3.5 to 4.5 per cent.—Chem. and Drugg., April 12, 1890, 502.

Uric Acid—Estimation.—Arthand and Butte propose the following method, founded upon the property possessed by uric acid of forming an insoluble urate with copper. Their reagent is formulated as follows: Sulphate of copper, 1.484 gm.; hyposulphite of sodium, 20 gm.; tartrate of potassium and sodium, 40 gm.; distilled water, q. s. to make one litre of solution. Contact with the hyposulphite reduces the copper salt, and the excess of the former contributes to maintain the copper salt unchanged, and to give stability to the mixture. Experiment, say the authors, shows that 1.484 gm. of sulphate of copper is required to precipitate 1 gm. of uric acid, hence, 1 ccm. of the authors' mixture corresponds to 1 mgm. of uric acid. In using, the phosphates are precipitated from the urine by carbonate of sodium in excess. Of the filtered liquor 20 ccm. is taken, and into this the reagent is introduced drop by drop, until precipitation and flocculence ceases. The authors say that this reagent is very sensitive. —Amer. Jour. Pharm., March 1890, 134–135; from Répert. de Pharm., Jan. 10.

Uric Acid—Solvent Action of Lithia, which see under "Inorganic Chemistry."

Calcium Hippurate—Extemporaneous Preparation and Medicinal Use. —Calcium hippurate crystallizes in oblique rhombic prisms, and is soluble in 18 parts of cold water. It has been employed in uric diathesis and in hepatic cirrhosis, and for this purpose may be made extemporaneously, according to the prescription of Dujardin-Beaumetz, as follows: Hippuric acid, 1 p.; lime-water, 35 p.; syrup, 35 p. Dose: A tablespoonful.—Amer. Jour. Pharm., April 1890, 172.

Leptotrichic Acid.—A crystalline constituent prominently present in *Leptotrichum glaucescens*, which see under "Materia Medica."

Fumaric Acid—Synthesis.—E. H. Keiser has succeeded in synthetically preparing fumaric acid from acetylene. By the action of iodine upon acetylene two isomeric di-iodides—the one solid, the other liquid—were obtained. The solid acetylene di-iodide (in crystals) was dissolved in alcohol, two molecules of potassium cyanide added, and the solution was boiled for thirty-six hours in a flask with an inverted condenser. Caustic potash was thereupon added, and the boiling continued for two hours longer. On cooling the contents of the flask, a considerable quantity of needle-shaped crystals separated from the liquid. They were removed from the solution, and on examination proved to be the potassium salt of fumaric acid, which crystallizes in the form of needles, insoluble in cold alcohol. More of the salt was obtained from the mother-liquor. The aqueous solution of the potassium salt was treated with silver nitrate, and a white precipitate consisting of the silver salt was obtained. The silver salt was purified by dissolving it in nitric acid and re-precipitating it by carefully neutralizing the solution with ammonia. The silver salt of fumaric acid is characterized by its great insolubility in water, and by the fact that when it is heated it deflagrates like gunpowder. Both of these properties were exhibited by the silver salt of the acid made by synthesis.—Chem. News, April 11, 1890, 175–176.

Tannin—Formation in Leaves, etc.—G. Kraus has studied the physiology of tannin. The formation of tannin in leaves depends on the presence of light and carbonic anhydride: the outer leaves of a plant exposed to direct sunlight will contain far more tannin than the inner leaves. Leaves which are not green are not capable of producing tannin. It must not, however, be assumed that tannin is a product of assimilation of the chlorophyll-grains, inasmuch as there are innumerable plants which assimilate carbonic anhydride without ever producing tannin; and oak, willow, and alder leaves assimilate in dull weather without the amount of tannin being increased. The tannin produced in the leaves passes into the branches and roots, and there is no experimental evidence to show that the tannin which has once passed into the rhizome undergoes further change; there is rather an increase in the amount of tannin in the rhizome through a production in the dark. There is not yet sufficient evidence to show whether tannin is produced from non-nitrogenous substances, or whether it is formed in the conversion of nitrogenous compounds into albuminoids. It seems probable that aromatic compounds may be formed in the production of albumin, some of which are used in the building up of albumin molecules, whilst others yield tannin.—Amer. Jour. Pharm., Nov. 1889, 568; from Bied. Centr., xviii., 330, through Jour. Chem. Soc., Sept. 1889, 917.

Tannic Acid—Varieties from Oak Barks, etc.—Dr. Etti states that he has obtained from oak barks of different origin a series of three tannic acid compounds represented by the formulæ $C_{16}H_{14}O_9$, $C_{17}H_{16}O_9$, and $C_{18}H_{18}O_9$, one from the bark of the red beech, with the formula, $C_{20}H_{22}O_9$, and another from hop strobiles represented by the formula $C_{22}H_{26}O_9$. At present, therefore, the C_{19} and C_{21} compounds are wanting in this homologous series. Each compound is said to have its particular color, ranging from brown red to light red. Whilst two of the acids from oak bark, when dissolved in very weak spirit, give with ferric chloride a dark blue color like gallic acid, the other acids mentioned give with ferric chloride different shades of green.—Pharm. Jour. and Trans., Nov. 30, 1889, 424.

Tannin of White Oak Bark—Characters, etc.—See *Quercus alba* under "Materia Medica."

Tannin—Solubilities, etc.—B. S. Proctor records experiments undertaken with a view to get an explanation of the somewhat anomalous behavior of tannin towards ether. According to the B. P., tannic acid is only sparingly soluble in ether, but Mr. Proctor confirms some previous observers in the statement that ether is really capable of forming a solution with a relatively large quantity of that compound. What appears to happen when commercial tannin is added to methylated ether is that after a time two ethereal layers are formed, one heavy and turbid, and the other light and clear, and that with successive additions of tannin the lower stratum increases in bulk and the upper one decreases and finally disappears. In one experiment this point was reached when 180 grains of tannin had been added to about 235 grains of ether, and the liquid then yielded on filtration a very small quantity of insoluble matter and was still unsaturated. The experiments were varied in many ways, involving higher rectification of the ether and drying of the tannin, but the nature of the solution, whether one of ether in tannin or tannin in ether, or whether an etherate is formed, cannot yet be said to be demonstrated. The solubilities of tannin in water, alcohol, and other menstrua, are also given as follows:

100 p. *cold water* form a syrupy solution with 253 p. tannin.
100 p. *hot water* form a syrupy solution with 300 p. tannin.
100 p. *rectified spirit* or *absolute alcohol* dissolve 120 p. or more of tannin.
100 p. *chloroform* dissolve about 0.007 p. tannin.
100 p. *benzol* dissolve less than 0.007 p. tannin.
Brine dissolves only traces of tannin.

—Yearbook of Pharm., 1889, 480–491.

Tannin—Rapid Process of Determination.—E. Guenez recommends a process for the rapid determination of tannin, which is superior to Löwenthal's process, modified by Neubauer, inasmuch as it is applicable to all tannins. The process is based upon the following reactions:

1. If into a boiling solution of potassium-antimony tartrate, mixed with a suitable aniline color, there is poured a solution of tannin, there is formed a precipitate of antimony tartrate, which carries down the coloring matter, forming a true lake. If the proportion of tannin is sufficient, the supernatant liquid becomes colorless. The antimony salt must be in excess in reference to the coloring matter.

2. The volume of the colored solution of the antimony salt, and the volume of the solution of tannin which must be added, are always proportional. Dilution does not affect the results.

3. A given quantity of antimony tannate always fixes the same quantity of coloring-matter.

4. If a solution of gallic acid is poured into a boiling solution of the antimony salt, no immediate precipitate of antimony gallate is formed. Under the same conditions, the antimony tannate is produced immediately. Hence it is permissible to suppose that the presence of gallic acid does not interfere.

The method of operating is as follows:

A solution is prepared of

Antimony salt	12 grams.
Poirrier's green, 4JE	1 gram.
Distilled water	1 litre.

The antimony salt and the coloring matter are dissolved separately; the two solutions are then mixed and filtered. The aniline greens are the only colors suitable, and Poirrier's green, 4JE, has given excellent results. This solution is standardized by means of a solution of tannin in ether, perfectly pure and dried previously in a vacuum over sulphuric acid. A solution is made up containing 5 to 6 gms. per litre, and there is added a small quantity of thymol, dissolved in alcohol to prevent mouldiness. A burette, fitted with a glass cock, is filled with a solution of tannin, and, on the other hand, 20 c.c. of the colored solution of antimony salt and an equal volume of distilled water are put in a glass tube 35 cm. in diameter. The colored solution is raised to a boil, and the tannin liquid is run in, at first by c.c., and afterwards by drops, until the complete decoloration of the liquid, which must be boiled anew after each addition of tannin. There is formed a green flocculent precipitate, which readily collects together, and enables the decoloration of the liquid to be observed. When complete, the volume of the tannin consumed is read off on the burette, and the standard of the antimony solution is thus known.

This method is readily applicable to the analysis of industrial extracts, but as the tannins of these extracts are not identical with the tannin of nut-galls, which has been selected as a standard, the richness of an extract will be represented in the analysis by an equivalent weight of nut-gall tannin.—Chem. News, April 25, 1890; from Compt. rend., 1890, 532.

ORGANIC BASES.

a. Natural Bases.

Alkaloids — Change in Seeds during Germination.— E. Heckel has studied the behavior of certain alkaloidal constituents of seeds during germination, selecting typical alkaloids. For *coffeine* the seeds of *Sterculia acuminata* were used. The fresh seeds contained in 100 gm. 2.37 gm. coffeine; after one year the cotyledons contained only 1.072 gm., after two years, 0.70 gm. and after three years 0.21 gm. During the time the alkaloid disappeared chlorophyll and potassium nitrate, which are never present in the recent seeds, made their appearance. For the alkaloids of the pyridine series *Strychnos Nux vomica* and *Datura Stramonium* were used. In a relatively short time (2–5 months, depending on the size of the seeds) all the alkaloids in the endosperm had been converted into more assimilable compounds. That this change is produced by the embryo was shown by removing the same and placing the seeds in moist earth, when the endosperm retained its entire amount of alkaloids. In *Physostigma venenosum* the eserine disappears in the cotyledons during germination, and the new compounds are transported into the young plant. Eserine disappears also when the embryo is removed and the seed is then planted. From his experiments the author draws the conclusion that the alkaloids act as a reserve material for the nourishment of the young plant, and must undergo a change in chemical constitution to become assimilable.—Amer. Jour. Pharm., June 1890, 298; from Compt. rend., 1890, 88.

Alkaloids—Solubility in Pure Ether.—K. Tamba has made experiments to determine the solubility of certain alkaloids and alkaloidal salts in chemically pure ether, cold and boiling, and also when exposed for some time to ether vapor or boiling ether. The ether used in these experiments had first been treated with metallic sodium, and was then repeatedly rectified from caustic lime and anhydrous sulphate of copper. After giving the details of his experiments, the author gives the solubilities as ascertained, as follows:

ALKALOIDS AND SALTS.	QUANTITY SOLUBLE IN 100 PARTS OF PURE ETHER.		
	At 15° C.	At boil. point 5 minutes.	By extraction 40 minutes.
Atropine Sulphate	0.007	0.0133	0.065
Brucine	0.5033	0.480	0.765
Colchicine	0.510	. .	. . .
Morphine	0.025	0.057	0.130
Morphine Sulphate	0.033	0.007	0.075
Narceine	0.0033	.	. . .
Narcotine	0.387	0.680	2.545
Strychnine	0.0232	0.057	0.305
Strychnine Nitrate	0.0013	0.0133	0.055
Thebaine	0.5233	. .	. . .
Veratrine	1.527	. .	. . .

—Amer. Drugg., April 1890, 74; from Mittheil. phar. Inst. Erlangen, ii., 283.

Alkaloids—Various Reagents.—A. L. Brociner draws attention to a solution of 1 gm. perrutheniate or rutheniate of potassium in 20 c.c. very pure concentrated sulphuric acid (specific gravity 1.184) as a reagent for alkaloids. *Solanine*, with a drop of this reagent, in a few minutes begins to assume a red color; after about 20 minutes the whole liquid has acquired the same color, which disappears on slight heating. *Ononin* is colored immediately brownish-red. *Chelidonine* gives a green coloration. *Imperatorin*, at first blue, soon changes to an intense green. The latter reaction is best obtained with the perrutheniate, while rutheniate gives the best results with the rest. The author furthermore calls attention to a solution of 1 gm. ammonium uranate in 20 c.c. concentrated sulphuric acid. This solution must be prepared just before using. *Codeine*, on slight heating, gives a blue color. *Imperatorin* also gives a blue color, which soon disappears, especially on heating. *Morphine* gives, on warming, a dirty green color, which slowly disappears.—Amer. Jour. Pharm., Feb. 1890, 94; from Jour. de Pharm. et de Chim., 1889, xx., 390.

Alkaloidal Hypophosphites—Extreme Solubility of the Morphine and Strychnine Compounds.—H. W. Jones calls attention to the possible value of hypophosphorous acid as a solvent of strychnine and morphine for hypodermic medication. Both these alkaloids dissolve readily, according to the author, in dilute hypophosphorous acid to form solutions which can be obtained neutral, or only very faintly acid, by using a slight excess of the alkaloid. The hypophosphite of strychnine is described as a very stable salt in solution, suitable not only for hypodermic injection, but as a substitute for the hydrochlorate in the official liquor strychninæ, which sometimes causes trouble in cold weather. The ready solubility of morphine in the dilute acid allows of a solution of 1 in 6, or even stronger, being easily prepared.—Yearbook of Pharm., 1889, 402–403.

Opium Alkaloids—Forensic Determination.—Prof. Hilger, in connection with Paul Küster, has made a study of the methods proposed for detecting opium, or rather its most characteristic alkaloids—narcotine, codeine, and morphine—in forensic analysis. As a result of their very exhaustive experiments, the authors recommend the following method:

Reduce the substance to be examined to a comminuted state, if necessary, and extract it twice with water acidulated with tartaric acid. This is best done by triturating it with the solvent to a thin magma, and digesting, each time, during one hour at a temperature of 50° to 60° C. Allow the mass to cool to 30° C. and separate the liquid portion. A good method to accomplish this is to transfer the whole mass to a filter which is provided a little above its point with a sieve plate, then to connect with the filter pump. In most cases it will be found impracticable to use a flannel strainer or paper filter. Now evaporate the obtained liquid upon a water-bath to the consistence of a thin extract, mix with about 25 gm. of plaster of Paris (dehydrated), and warm for a little while on the water-bath so that the mass may become dry, which will take place in about 10 minutes if the gypsum was of good condition. Reduce the colored mass (which has an *acid* reaction) to powder, transfer it to a Soxhlet extractor, and extract it during three hours with ether. The ethereal extract, that is, the residue left after the evaporation of the ether, contains narcotine in so pure a state that it may be readily identified.

Next deprive the acid mass of the residual ether, mix it with a concentrated solution of sodium carbonate until it has a strongly alkaline reaction, dry it on a water-bath, and extract it again with ether in a Soxhlet apparatus during six hours. Towards the end of the operation it will be noticed that small crystals (of morphine) appear on the walls of the flask in which the ether is kept boiling. These may be removed, after the operation is completed, either with a brush or a small spatula, and readily identified as morphine. (It has first been observed by Poellnitz and confirmed by Dragendorff that when morphine is dissolved in ether it gradually passes from an amorphous to a crystalline condition, in which latter form it is extremely little soluble in ether.)

Now evaporate the ethereal solution, dissolve the residue in water acidulated with hydrochloric acid, and shake with chloroform, which will remove the last traces of narcotine. (It may be readily recognized after evaporating the chloroform.) Free the aqueous liquid from traces of chloroform by warming, render it faintly alkaline, and shake it with ether, which will take up the codeine. On evaporating the ether, very handsome and sharp reactions for codeine are obtained. Next proceed to extract the morphine, most of which is still present in the mass. This may either be accomplished by means of amylic alcohol, after Stas, or in the following manner devised by the authors:

Remove the residuary mass from the extractor, acidulate it, and extract it with alcohol. Free the dark-colored extract from alcohol, dissolve the residue in water acidulated with hydrochloric acid, mix it with freshly precipitated and well-washed aluminium hydrate, and warm gently. This results in the production of a lighter colored (yellow) filtrate, the alumina retaining some coloring matter, but no alkaloids. Now add to the filtrate some freshly precipitated lead oxide, and enough subacetate of lead solution to produce an alkaline reaction. Mix the lead precipitate with sand, dry the mixture, and extract it with chloroform. Upon evaporation of the latter, the residue will give the reactions of morphine.—Amer. Drugg., April 1890, 70–71; from Mitth. a. d. Phar. Inst., etc., der Univ. Erlangen, ii., 291.

Morphine—Estimation in Opium.—Prof. F. A. Flückiger estimates morphine in the following modified manner: 8 gm. of powdered opium are placed in a plaited filter 12 cm. in diameter, the funnel being slightly tapped in order to bring the powder to the bottom, and the whole dried at 100° C. After half an hour, a mixture of 10 c.c. chloroform and 10 c.c. ether is poured on the powder, the funnel being covered and tapped a number of times; then 10 c.c. chloroform additional are poured on. After the liquid has drained off, the filter is spread out and the powder dried at a slightly elevated temperature. The powder is then shaken with 80 gm. water, to which has been added 0.2 gm. ammonium oxalate to separate the calcium present, and filtered after two hours. 42.5 gm. of the filtrate are treated in a small tared flask with 7.5 c.c. alcohol (sp. gr., 0.83), 15 c.c. ether and 1 c.c. ammonia (sp. gr. 0.96). After six hours, having shaken often, the contents of the flask are poured on two plaited filters, one inside of the other, and 10 cm. in diameter, the flask being rinsed with 10 c.c. water or an aqueous solution of morphine (1 : 5,000), and poured on the filters. These are dried at slightly elevated temperatures, and at last at 100° C. The morphine is then transferred to the flask, which has been dried at 100° C., and the whole heated to this temperature until constant. The morphine obtained represents one-half the quantity of the opium.—Arch. d. Pharm., Aug. 1889, 721–732.

Morphine—Separation in Forensic Investigations.—D. H. Dixon proposes the following method for the separation of small quantities of morphine in forensic investigations: The finely divided portions of the cadaver are repeatedly extracted with acidulated water (urine and other liquids being first concentrated by evaporation), the combined liquids filtered, evaporated to nearly a syrupy consistence on a water-bath, extracted with from four to five times its volume of 95 per cent. alcohol, again filtered, the filtrate freed from alcohol by distillation, the residue in the flask or retort again filtered and then shaken with amylic alcohol as long as coloring matters continue to be abstracted.

Thereupon the acid solution is heated to from 50° to 60° C., an equal volume of amylic alcohol added and agitated, the liquid then made alkaline with ammonia water and again agitated for some time. After the separation and removal of the amylic alcohol from the aqueous liquid, the operation is repeated by agitation with a fresh portion of amylic alcohol. The amylic alcohol liquids are then distilled or allowed to volatilize on a water-bath, the residue evaporated to dryness, and, by the aid of a gentle heat, repeatedly extracted with slightly acidulated water. The acid liquids are then filtered and the filter carefully washed. It is advisable to again agitate the acid filtrate with amylic alcohol for the removal of the coloring matter, and then to pour upon the separated acid liquid the above mentioned mixture of 10 parts of anhydrous ether and 1 part of 95 per cent. alcohol, made alkaline with ammonia water, and agitate. This agitation with ether-alcohol is to be repeated several times. In this way the morphine may be obtained so deprived of coloring matters that all the reactions of the alkaloid may at once be applied.—Amer. Drugg., Oct. 1889, 188.

Morphine Salts—Reaction with Hydrocyanic Acid.—Prof. John M. Maisch, referring to a recent statement in a number of medical journals that cherry laurel water is incompatible with morphine salts, inasmuch as the hydrocyanic acid it contains forms an insoluble cyanide of morphine, calls attention to his former observation (see Proceedings 1871, 225) that hydrocyanic acid *does not* precipitate neutral solutions of morphine, but that precipitation does occur when the hydrocyanic acid is replaced by an alkaline cyanide. Such precipitate, however, is not morphine hydrocyanate, but, as shown by Prof. Flückiger, is alkaloidal morphine. Professor

Maisch observes that the erroneous statement in the medical journals can only be explained by the improper preparation of the cherry laurel water used. If made by distillation from the leaves it cannot contain a cyanide, and the free hydrocyanic acid will not cause a precipitate. Very likely the water was prepared by means of magnesia, in which case it must have contained magnesium cyanide which would precipitate morphine.—Amer. Jour. Pharm., April 1890, 163–164.

Apomorphine—Adaptability as a Test for Nitrites in Potable Waters.—Attention is drawn in "Pharm. Ztg." (1889, 429) to the fact that apomorphine, being as sensitive as metadiamidobenzol as a test for nitrous acid and nitrites, is especially adapted to the examination of drinking waters. 0.02 gm. crystallized apomorphine hydrochlorate are dissolved in 100 c.c. of the water to be examined, and then a little sulphuric acid is added; traces of nitrites are sufficient to develop a distinct red coloration. Dilute nitric acid does not interfere with this test, but concentrated nitric acid produces the same coloration, due, probably, to the reduction of the nitric acid.

Codeine—Reaction with Morphine Salts.—Edo Claassen calls attention to the fact that alkaloidal (free) codeine, when brought in contact with salts of morphine in solution (sulphate, etc.) precipitates the morphine from solution, the acid of the morphine uniting with the codeine. Since codeine is not unfrequently prescribed with salts of morphine, it is important that this incompatibility should be generally known. The observation, furthermore, points out a method for determining *free* codeine in mixtures. Upon adding a known quantity of a morphine salt to such, the amount of codeine is readily calculated from the quantity of morphine that is separated out. It follows, also, from the above that codeine should be prescribed as a salt only with salts of morphine.—Pharm. Rundschau, Feb. 1890, 40–41.

Codeine—Physiological Effects.—Dr. G. Rheiner records the therapeutic effects of codeine in the cases of thirty-five patients, varying in age from a few weeks to seventy-five years. The majority of these suffered from bronchitis or broncho-pneumonia; six were under treatment for whooping-cough; the remainder were affected with cardiac dyspnœa, asthma, or phthisis. His experience leads him to advocate the use of codeine where a milder narcotic than morphia is wished; and although he thinks that morphia in suitable doses may be given with safety to the youngest children, he looks upon codeine as less dangerous. From relatively large doses, as for example $\frac{1}{70}$ of a grain daily to a child nine months old, he finds no unpleasant effects, and 2 grains daily were quite harmless in adults. He holds that codeine has the advantage over morphia in not causing anorexia. It seems in some cases to increase appetite, probably by its beneficial influence in removing discomfort. Whilst relieving irritation, it does not cause sickness or catarrh, and slight dizziness and moderate headache in one or two cases were the only troubles noticed after its use. It may produce its effects in half an hour, or not for several hours.

The doses of codeine given by Rheiner were small: $\frac{1}{140}$ to $\frac{1}{70}$ of a grain in infants under one year, and from the $\frac{1}{40}$ to $\frac{1}{30}$ of a grain up to five years, whilst to adults from $\frac{1}{3}$ to $\frac{1}{2}$ a grain. On the whole, the observations do not help much in the estimation of the relative influence of morphine and codeine.—Amer. Jour. Pharm., Jan. 1890, 37; from Therap. Monatsh., Sept. and Oct. 1889; through Med. Chron., Dec. 1889.

Narceine—Relation of Purity to Activity.—Referring to the statement of Laborde (Arch. de Pharm., April 1887), that narceine, specially purified so as to be free from morphine and codeine, was found to be more active than any he had used before, D. B. Dott observes that considering the facility with which narceine can be separated from morphine and codeine, it is highly improbable that any manufacturer would send out the alkaloid so contaminated; but even supposing that some morphine and codeine were present in the narceine it is difficult to conceive how they would affect its action. Referring, furthermore, to the paper of E. Merck on "Chemically pure narceine" (see Proceedings 1889, 691), in which he corrects certain misconceptions of previous writers on the subject, Mr. Dott points out that the tenacity with which narceine retains hydrochloric acid had been previously recorded by Dr. Wright, who obtained pure narceine from the basic hydrochloride by converting it first into sulphate. As to the nature of the basic hydrochloride, Mr. Dott does not think it to be a mixture or compound of the normal hydrochloride with the alkaloid, but that in it so many molecules of alkaloid are loosely combined with so many molecules of hydrochloric acid, after the manner of the relation of water of crystallization to a salt molecule.

The author concludes by expressing the opinion, that so far no proof has been adduced to show that commercial narceine ever contains any impurity which can affect its value as an article of the materia medica.—Yearbook of Pharm., 1889, 470–473.

Narceine—Weak Basic Reaction.—The statement of Merck that narceine possesses a stronger basic character than is generally assumed (see Proceedings 1889, 691) has induced P. C. Plugge, who holds a contrary opinion, to reinvestigate the subject. The results confirm his previous opinion, and agree also with those obtained by Mr. Dott (see above). The fact that narcotine, papaverine and narceine can be separated from the acid as well as from the alkaline solution, by shaking these solutions with benzol, chloroform, etc., after the method of Dragendorff, while the three other opium alkaloids, morphine, codeine and thebaine, can be isolated only by shaking the alkaline solution, places narceine in the group of weak bases. Concerning the adulteration of commercial narceine maintained by Laborde (see Proceedings 1889, 692) the author, in accordance with Mr. Dott, thinks it highly improbable that narceine would be sent out so contaminated, even with the opium alkaloids, morphine and codeine, most widely differing from narceine.—Pharm. Jour. and Trans., Nov. 23, 1889, 401–402.

Chemically Pure Narceine—Rejoinder to Criticisms.—E. Merck in a rejoinder to D. B. Dott's criticism of his former paper, observes that *chemically pure narceine* was not hitherto obtainable in commerce. He had pointed out, on the contrary, that the samples of English narceines examined by him during a series of years did not consist of the free base, but were basic salts—hydrochlorides, acetates and sulphates—and that in addition they contained other substances in varying quantities. He had not, as ascribed to him by Dott, regarded these substances as mixtures of free bases and normal salts, but had stated in print that they are "probably to be considered as basic salts. In respect to the use of the alkaloid it was expressly stated that "good commercial narceine might fully suffice for therapeutic use;" but the chemist must be more thorough-going in his requirements as to the purity of narceine, and the object of his communication was to show that.

Respecting Plugge's criticism (see above) Merck remarks that his observations as to the basicity of narceine are to some extent distorted by that writer. What he wished to bring out was that *chemically pure narceine*, contrary to previous statements, possesses a *weak alkaline reaction*, and that it manifests quite a *peculiar affinity for acids*, on which account it holds an exceptional position among opium alkaloids. The author cannot hereafter take seriously into consideration any statements as to the chemical nature of narceine, if they are not based upon experiments with chemically pure narceine.—Pharm. Jour and Trans., Dec. 21, 1889, 482.

Laudanine and Protopine—Rare Opium Alkaloids.—E. Merck states that he has succeeded in obtaining two of the rarest opium alkaloids, namely, *laudanine* and *protopine*. He found their properties to correspond essentially with the statements made by Hesse at the time he discovered them. Laudanine, especially, on account of its analogy to morphine, appears to be of great interest. It is soluble in caustic soda solution, and can be converted by methylation into a new base, which chemically resembles codeine.—Pharm. Jour. and Trans., Dec. 21, 1889, 482.

Chelidonine—The Alkaloidal Constituent of Stylophorum diphyllum, which see under "Materia Medica."

Cinchona Alkaloids—Solubility in Xylol.—A. J. Swaving and A. Hilger have had occasion to investigate the solubility of the four principal cinchona alkaloids in xylol (boiling point 136–139° C.=277–282° F.; mixture of para- and meta-xylol), and have found the following rates:

1 Part of:	At 15° C. is soluble in parts of xylol.	At 138° C. is soluble in parts of xylol.
Quinine	909	155
Quinidine	211	8
Cinchonine	7407	170
Cinchonidine	2222	7.8

The temperature 138° C. happened to be the boiling point of the xylol used in these experiments.

Though the authors make no further statement regarding the application of the above data, it is evident that a method of separation of cinchona alkaloids can be based thereon. The authors have also studied the ratio existing between the four

Cinchona Alkaloids and Mayer's Reagent (an aqueous solution of 13.546 gm. of mercuric chloride and 49.8 gm. of potassium iodide diluted to 1 liter;)

One cubic centimeter of Mayer's solution corresponds, respectively, to

0.0106 gm. quinine.
0.0092 gm. quinidine.
0.0079 gm. cinchonine.
0.0091 gm. cinchonidine.

—Amer. Drugg., May 1890, 83; from Mittheil. a. d. Pharm. Inst. Erlangen, ii., 282.

Quinine—Estimation in Mixtures.—Dr. Seaton and H. D. Richmond propose the following method for estimating the quantity of quinine in mixtures, which is based upon the observation that quinine bisulphate is neutral to methyl orange, while the base itself has no action on phenolphthalein. The authors operated as follows:

To 25 c.c. of medicine add 2 drops of methyl orange (25 gm. in 1 liter of water) and 2 drops of phenolphthalein (5 gm. in 1 liter of 50 per cent. alcohol), titrate with one-tenth normal baryta solution until the free acid is all neutralized, which is shown by the red color just changing to brown. Note the number of cubic centimeters used. Continue titration until the pink color of the phenolphthalein appears. Care must be taken not to overstep this last point, as the color does not develop quite immediately. The difference between the two titrations, multiplied by the factor 0.218, gives the weight of the quinine sulphate (*i. e.*, the salt with 7 molecules of water) in grammes in the 25 c.c. The number of cubic centimeters in the medicine prescribed is known, and the calculation becomes a simple proportion.

The method is, of course, not applicable in the presence of salts of which the base is precipitated by baryta.

The following is the result of the estimation of quinine in the same medicines by the volumetric and gravimetric processes respectively. Four samples of medicine were obtained in the usual way, and it will be seen that the results of the two methods closely correspond:

	Volumetric.	Gravimetric.
1.	21.2	20.8
2.	23.4	23.2
3.	16.5	16.1
4.	20.3	20.0

They have further tested the process in the following way: Solutions of quinine, accurately prepared, were obtained from Messrs. Bell & Co. Solution A contained 12 grains by weight of Howard's quinine sulphate; solution B, 20 grains; solution C, 18 grains; and solution D, 15 grains. Four samples of each solution were obtained, and were submitted to estimation by their process.

The process gave the following results:

A (12 gr.)	found respectively	12.1	12.2	11.8	12.0
B (20 gr.)	"	19.7	19.9	19.9	19.7
C (18 gr.)	"	17.5	17.6	17.5	17.8
D (15 gr.)	"	15.4	14.7	14.9	15.2

—Amer. Drugg., May 1890, 93–94; from "Analyst," 1890, 42.

Quinine Salts—Increase of Solubility by Antipyrine, etc.—Grenel also calls attention to the effect of antipyrine to increase the solubility of quinine salts (see Proceedings 1889, 697). He states further that such a solution does not give the thalleioquin reaction, but yields a flesh-colored precipitate, which crystallizes from alcohol in needles. This indicates that a chemical reaction has taken place between the two compounds, but the product has not as yet been studied.—Apoth. Ztg., 1889, 1365.

Sulphate of Quinine—Test of Purity.—E. Hirschsohn gives the following method for determining whether sulphate of quinine is chemically pure: 0.2 gm. of the salt is well shaken with 5 c.c. of a mixture of 30 parts by volume of petroleum ether (specific gravity 0.680) and 70 parts of chloroform, and filtered immediately. To the perfectly clear filtrate three volumes of petroleum ether are added. Pure quinine sulphate yields a clear solution, while all other cinchona alkaloids show opalescence or give precipitates. According to the author, 0.1 per cent. of the accompanying alkaloids can still be detected by this method.—Amer. Jour. Pharm., June 1890, 296; from Pharm. Ztschr. f. Russ., 1890, 1.

Quinine Tannate—Method of Determining Quinine.—Dr. S. Neumann determines the quinine in tannate of quinine as follows: He weighs out exactly 2 gm. of pulverized quinine tannate, and introduces it into a glass cylinder holding about 300 c.c., and having a well-fitted stopper, previously charged with 20–25 c.c. potassa-lye (specific gravity 1.240), and shakes the whole well up. Care must be taken that the tannate does not adhere to the sides of the glass, as it is there not easily removed by the potassa-lye. The whole is then made up to 60–80 c.c., and 100 c.c. ether, accurately measured, are added, the stopper is rapidly inserted, and the whole is shaken well together. After a few minutes, there appear two separate layers of liquid, the colorless ether above and below the potassa-lye colored brown by the tannin. No solid particles should be floating about in either. If the potassa is so dark as to be opaque, it is diluted or the cylinder is laid horizontally and observed from above. After the two strata have completely separated, the cylinder is unstoppered, 50 c.c. of the ether are quickly measured off with the pipette, and poured into a weighed beaker. The ether is allowed to evaporate slowly at a temperature of 50–60°, and the residue (quinine anhydride) is dried at 100°. When cold, it is weighed, and if 2 gm. of the substance were originally taken, we have at once the percentage. The residue can be examined for other alkaloids. It should be perfectly soluble in dilute hydrochloric or sulphuric acid, otherwise either the ether was impure or fats or resins were present in the sample.—Chem. News, April 18, 1890, 192; from Ztsch. Anal. Chem., 1889, No. 663–668.

Cupreïne—Preparation of the Pure Alkaloid.—A. C. Oudemans, Jr., has prepared pure cupreïne as follows: The commercial basic sulphate was converted into the neutral hydrochloride by heating it with 10 times its weight of water, and adding hydrochloric acid until a clear solution was obtained. To this was added the calculated quantity of barium chloride required to precipitate the sulphuric acid, the solution being continually shaken; the precipitate was allowed to settle, the liquid filtered through animal charcoal, and, when cold, poured little by little into a dilute solution of ammonia, which was shaken continually; finally, the precipitate thus obtained was washed rapidly with cold water. If any had become colored, it was digested with 70 per cent. alcohol, and the residue dissolved in alcohol, and precipitated by the cautious addition of water; the alkaloid was thus obtained perfectly white and pure. The formula is $3(C_{19}H_{22}N_2O_2)+H_2O$. When anhydrous, it melts at 197°; its specific rotatory power is $[a]_D=175.4^\circ$ in dilute aqueous or alcoholic solution. Various salts were prepared, and their solubility in water and their specific rotatory power determined.—Amer. Jour. Pharm., Nov. 1889, 573–575; from Rec. Trav. Chim., viii., 147–172, through Jour. Chem. Soc., Oct. 1889.

Moradeine.—An alkaloid from *Quina morada*, which see under "Materia Medica."

Aconitine—Danger in its Administration.—A number of years ago (see Proceedings 1882, 427) attention was drawn to the different toxic action of aconitine as obtained by a different process, and a fatal case of poisoning, in Holland, was reported. A case of death is now reported in "Jour. de Pharm. d' Anvers" (Feb. 1890), which occurred after ingesting two pills of a quarter of a milligramme each, of crystallized aconitine. They were prescribed by a physician. It is now two years since the *Société de Pharmacie de Paris* recommended that pills of this substance should not contain more than one-tenth of a milligramme of this substance. A list was at that time read of several deaths having occurred after taking a single granule, one-quarter of a milligramme of the crystallized principle.—Amer. Jour. Pharm., June 1890, 299.

Japaconitine—Probable Identity with Aconitine from A. Napellus.—In their investigations some twelve years ago Paul and Kingzett pointed out some differences in the aconitine of Japanese aconite root from that of

Aconitum Napellus roots (see Proceedings 1878, 599), and subsequently (see Ibid., 1879, 511), Wright and Luff confirmed the distinction between the two aconitines, and named that from Japanese roots "japaconitine." Dr. Lubbe now reports ("Thesis," Dorpat) that in working upon material imported direct from Japan under the name of "kusa-uzu," and believed to be identical in origin with that used by the chemists previously named, he obtained still a different result, the crystallized alkaloid separated by him being, in his opinion, identical with crystalline aconitine from *Aconitum Napellus* roots. It was obtained in rhombic prisms, containing no water of crystallization, and melting at 183°–184° C., being the same figure as given by Dr. Wright. Pseudaconitine was not detected in Japanese roots by Dr. Lubbe. It is also incidentally mentioned in the thesis that notwithstanding aconitine is so powerful a poison, it undergoes no chemical change in producing its effect, which is described as being "solely due to contact action."—Pharm. Jour. and Trans., June 28, 1890, 1057; from Apoth. Ztg., June 14, 1890, 321.

Mydriatic Alkaloids—Investigation Respecting Their Occurrence, etc.—E. Schmidt has reported some investigations on the mydriatic alkaloids. The length of keeping *belladonna root* has no effect on the alkaloid present, this being principally hyoscyamine. The time of collecting, however, has an influence, the first year's root containing hyoscyamine and atropine.

Scopolia atropoïdes and *Sc. japonica* containing hyoscyamine and hyoscine; the latter has been obtained in a crystalline form by C. J. Bender. Traces of a mydriatic alkaloid have been noticed in *Solanum tuberosum*, *S. nigrum* and *Lycium barbarum*.—Amer. Jour. Pharm., Jan. 1890, 13; from Pharm. Centralh., 1889.

Atropine Sulphate—Distinction of Commercial Sorts.—J. B. Nagelvoort observes that the distinction made in the price currents of chemical manufacturers, in speaking of *heavy* sulphate of atropine (the condensation product of hyoscyamine) or in mentioning a contradictory melting point (115° C.), or in quoting *atropinum purum* and *atropinum naturale*, will not be understood by many. The pharmacist would be saved a good deal of annoyance if the revised U. S. Pharmacopœia, in its description of the properties of atropine sulphate and pure atropine, would not repeat the accuracy of the edition of 1882, that these compounds must answer satisfactorily to properties distinctly different from those of hyoscyamine. Eminent ophthalmological authorities have observed that the effect of both alkaloids on the healthy and on the diseased eye is equal, and it appears from the author's examination of two samples from different manufacturers of high standing, as well as from the observations of others, that the atropine sulphate used in our drug stores at the present time is in reality hyoscyamine sulphate.—Amer. Jour. Pharm., March 1890, 118–119.

Belladonnine — Characters of the Commercial Article.—E. Dürkopf states that commercial belladonnine is the evaporated mother-liquor from atropine. After digesting its acid solution with ether and chloroform to extract the hydrocarbons, etc., the remaining atropine may be split into tropine and tropic acid, while hyoscine (about 18 to 20 per cent.) remains in the solution and the so-called belladonnine remains intact. Hyoscine gives a gold salt melting at 200° C. This explains the presence of pseudatropine among the decomposition products of crude belladonnine, which will be further investigated by the author.—Amer. Jour. Pharm., April 1890, 175; from Berichte, 1889, 3183.

Mandragorine—An Alkaloid from Mandragora autumnalis and M. vernalis.—F. B. Ahrens describes "mandragorine," an alkaloid obtained from the roots of *Mandrogora autumnalis* and *M. vernalis*, by extracting with alcohol, recovering the alcohol by distillation, taking up the residue with water acidulated with sulphuric acid, rendering the solution alkaline with potassium carbonate, agitating with ether and evaporating this solution. The alkaloid melts at 77–79°, and has the formula $C_{17}H_{23}NO_3$; the sulphate forms lustrous, deliquescent scales, the solution of which introduced into the eye dilates the pupil. Although isomeric with atropine, hyoscyamine and hyoscine, the double chlorides with the following metals possess different melting points: with Au, 153–155°; with Pt, 194–196°; with Hg, 160–161°; the crystalline forms of these double salts are not identical with those of the three alkaloids mentioned. The conversion of mandragorine into atropine by the action of sodium hydrate could not be effected. A second alkaloid in very minute quantity was extracted by treating the residue of the above alcohol extraction with water acidulated with HCl, concentrating, adding K_2CO_3 in excess and agitating with ether; the residue after evaporating the ether was also mydriatic, and formed double chlorides with Au, melting point, 147–153°; with Pt, melting point, 179–181°.—Pharm. Ztg., 1889.

Commercial Hyoscine Hydrobromide—Variable Characters.—Dr. E. Schmidt, in consequence of the observation made by him that *Scopolia atropoides* (which see under "Materia Medica") contained an alkaloid resembling, but not identical with, hyoscine, obtained for examination 10 grams of "hyoscinum hydrobromicum" from an alkaloid factory of repute. It was supplied in presentable crystalline fragments, attaining a centimetre in length, but presenting no definite crystalline form. Analysis of these crystals did not give the figures required for hyoscine hydrobromide, whilst the purified gold salt prepared from them could not be distinguished in respect of appearance or solubility from the gold salt of the new base from *Scopolia*, and on analysis it gave closely corresponding figures. The crystals melted at 210–212°, or slightly below the melting point of the gold salt of the new base (214°). The liberated base, when decomposed by baryta water, yielded atropic acid and a base forming a gold salt having a melting point higher than that of isotropine. The mother-liquor of the gold salt of the new base, when subsequently treated, yielded first shining scaly crystals, melting at 204° and approximating more closely in composition to hyoscine aurochloride, and afterwards a small quantity of yellow needles, corresponding in melting point and gold percentage to those attributed by Ladenburg to hyoscine aurochloride and also observed in a double salt previously obtained by Dr. Schmidt from *Scopolia japonica* and *S. atropoides*. As the characters observed in this sample of "hyoscinum hydrobromicum" varied much from those of a sample obtained from another source some time since, it would seem that under the name of "hyoscine salts" widely differing preparations occur in commerce, and Dr. Schmidt thinks that to this fact may be due the existing diversity of opinion as to the action of hyoscine.—Pharm. Jour. and Trans., May 3, 1890, 890; from Apoth. Ztg., April 12, 1890, 186.

Duboisine—A Mixture of Hyoscyamine and Hyoscine Apparently.—Duboisine, which was first described by A. W. Gerrard about twelve years ago (see Proceedings 1878, 207), and shortly afterwards by A. Pettit (Ibid., 208), as being the alkaloidal constituent of *Duboisia myoporoides*, has since been the subject of investagation by others: among them by Prof. Ladenburg (see Proceedings 1878, 552), who found commercial duboisine to be composed mainly of hyoscine, but expressed the belief that the drug probably originally contains also hyoscyamine.

In response to inquiries on this subject, Messrs. Schering & Co. now state that a short time ago they worked a quantity of *Duboisia myoporoides* leaves for "duboisine," and obtained a pure base in the form of a brownish thick liquid, the sulphate of which corresponded exactly and in every respect to the properties of sulphate of hyoscyamine. This they consider confirms the statement of Ladenburg, from which it would appear that they are not acquainted with the professor's later paper. Moreover, it may be remarked that pure hyoscyamine is described by him as a crystalline solid. Messrs. Schering add that hyoscine was obtained from the mother-liquor of the "duboisine sulphate," as well as from that of hyoscyamine sulphate worked from belladonna root. It seems probable, therefore, that as *Duboisia myoporoides*, like belladonna and henbane, contains both hyoscyamine and hyoscine, the products obtained from it and sent out under the name "duboisine" may consist of the one or the other base, either exclusively or in preponderance, according to the method of preparation.—Pharm. Jour. and Trans., March 1, 1890, 709.

Solanine and Solanëine—The Crystalline and Amorphous Alkaloidal Constituents of the Young Shoots of Solanum tuberosum, which see under "Materia Medica."

Crude Cocaine—Production in Peru, Characters, etc.—Dr. E. R. Squibb calls attention to the fact that "crude cocaine" is now produced in Peru so efficiently and of such good quality, that it seems highly probable that the importation of cocoa leaves into this country and Europe for the manufacture of cocaine is nearly at an end. The advantages of exporting the crude alkaloid from Peru rather than the coca leaves are many and important. There is an enormous saving of freight, the yield of alkaloid is greater by 13 to 15 per cent. by the same process from the same leaves, as worked here and in Peru; the leaves being worked while in their best and freshest condition, and the cost of the leaves is more uniform and much less in Peru, speculation in these being more easily avoided. The crude cocaine comes either in granular powder or in fragments of press cake, generally of a dull, creamy white color, but rarely quite uniform throughout the package, varying from a dirty or brownish white to very nearly white; though in this respect it is constantly improving. The larger portion of fragments are hard, compact and slightly horny when cut or scraped, the remainder softer, more porous and chalk-like. Recent importations, which chiefly come via Hamburg, assayed 90 to 96 per cent. of pure alkaloid, in one case even 98 per cent., and the quality is evidently steadily improving. The author, in this connection, gives a process for the

Assay of Crude Cocaine.—The various steps in this process consist: (1) in the proper selection of the sample, a small quantity being taken from a large number of the lumps in the parcels, selected on account of the differences in their appearance; (2) the determination of moisture in the sample, so selected by fusion at 91° C.; (3) solution of the sample in ether, specific gravity .725 at 15.6° C., washing the insoluble residue completely with ether, drying and weighing; (4) conversion of the alkaloid dissolved by the ether into oxalate, shaking the oxalate out by water, and determining the residue soluble in ether by the evaporation of the ethereal solution; (5) Rendering the aqueous solution of cocaine oxalate just alkaline by soda solution, completely shaking out the freed alkaloid with ether, and determining the pure alkaloid by spontaneous evaporation of the ether solution, and complete drying of the crystals produced, or, more quickly, by fusion at 91° C. The details of the process, which are quite circumstantial, cannot be reproduced here, and reference must therefore be had to the original paper in "Ephemeris," July 1889, 1168–1176.

Cocaine—Relationship to Atropine.—The studies of Professor Ladenburg and of Buchka have led them to assume a close chemical relationship between cocaine and atropine, and that it might be possible to convert one of these bases into the other. This has now been successfully effected by Dr. Einhorn, who, by splitting off the carboxyl group from anhydroecgonine, has converted it into tropidine, and has thus established the close relation of the cocaine and atropine series of compounds.—Pharm. Jour. and Trans., June 28, 1890, 1057; from Ber. d. D. Chem. Ges., xxiii, 1338.

Cocaine—The Formation of Benzoic Acid Used as a Test.—The formation of *benzoic acid* (along with ecgonine and methyl alcohol) when a cocaine salt solution is boiled, is used by Lerch and Schärges in a test for cocaine. If to a solution of cocaine salts one drop of solution of ferric chloride be added, a pale yellow coloration results; but by boiling, the color changes through orange to an intense red (resembling the color of ferric sulphocyanate). Of other substances giving the same reaction, benzoic acid and benzoyl-ecgonine alone need be considered. The presence of the former is not likely, but may be detected by its difficult solution in water; benzoyl-ecgonine melts at 198° C., and is easily soluble in water and alcohol, but *insoluble* in ether. Cocaine differs from benzoyl-ecgonine by melting at 98° C., and its ready solubility in water, alcohol and *ether.*—Amer. Jour. Pharm., Nov., 1889, 563; from Schwz. Wochensch. f. Pharm., 1889, 293.

Cocaine—Color Reaction.—M. Gœldner gives the following color reaction for cocaine: In a watch-crystal with white back-ground or in a small porcelain capsule, several crystals of cocaine (about 0.01 gm.) are agitated with six to seven drops of pure concentrated sulphuric acid, and to the faintly yellow fluid 0.05 gm. cocaine hydrochlorate added; after an immediate energetic reaction the fluid assumes a beautiful blue color, becoming more intense; the addition of a drop of sodium hydrate solution changes the blue color to red. The test applied to salts of morphine, strychnine, veratrine, and atropine gave no coloration which even approached the above.—Pharm. Ztg., 1889, 471.

It has since been noticed that the above color reaction of cocaine with resorcin is due to the presence of minute quantities of nitrate in the cocaine as impurity, and that the observation affords a very sensitive test for nitrates. See "Resorcin."

Cocaine—A Delicate Test.—According to Dr. Greittherr, a few drops of cocaine solution with 2–3 c.c. chlorine water and 2–3 drops of a 5 per cent. palladium chloride solution, give a fine red precipitate, slowly decomposed by water, insoluble in alcohol and ether, but soluble in a solution of sodium thiosulphate. Analogous tests with *seventy* other alkaloids gave, in many cases, variously colored solutions without precipitates or, in other cases, dirty-white or pale red precipitates. The test is so delicate as to detect traces of cocaine salts, in which case the precipitation occurs only after several minutes, and is facilitated by gentle agitation.—Amer. Jour. Pharm., Nov. 1889, 563; from Pharm. Ztg., 1889, 617.

Cocaine—Separation from Animal Remains.—To separate cocaine from animal remains, U. Mussi recommends the following process: The comminuted substance is mixed with 2 parts of alcohol at 90 per cent., acidulated distinctly with hydrochloric acid, digested for a long time at 60° in a reflux condenser, repeating this process with fresh alcohol, evaporating the filtrates almost to dryness at 50° to 60°, taking up the residue with water, shaking out the solution two to three times with ether, precipitating the residual aqueous concentrated liquid with baryta, and extracting repeatedly with ether. The ethereal solution is evaporated in a vacuum and the residue tested for cocaine.—Chem. News, Aug. 30, 1890; from Ztschr. Analyt. Chem., 1889, Part 3.

Methyl-Cocaine—Identity with Dextro-Cocaine.—Recent investigations of Liebermann and Giesel leave little doubt that the substance which they described as "methylcocaine" is essentially identical with the "dextrococaine" of Einhorn and Marquardt. The latter chemists also appear to have come to the same conclusion, some difficulty attending the crystallization having been overcome, whilst the characters have been found to be practically the same, and especially the nitrate has been ascertained to present the marked insolubility characteristic of the supposed methylcocaine. Einhorn and Marquardt have also prepared four homologues of dextrococaine, which are represented as the ethyl, propyl, butyl and amyl esters of benzoyldextroecgonine. The salts of all of them are described as producing upon the tongue anæsthesia quite similar to that resulting from the action of ordinary cocaine.—Pharm. Jour. and Trans., May 3, 1890, 889; from Ber. d. D. Chem. Ges.. xxiii., 926 and 979.

Cocaine Hydrochlorate—Incompatibility with Borax.—Julliard mentions that in preparing a collyrium containing hydrochlorate of cocaine and borax, cocaine was precipitated by the borax. The latter, he says, becomes alkaline in dilute solutions, hence the precipitate which, he suggests, would be prevented by the addition of a little boric acid.—Pharm. Jour. and Trans., May 31, 1890, 977; from L'Union Pharm., May, 1890, 210.

Cocaine Chromate—Its Formation a Test for Cocaine.—Dr. Karl Mezger uses the formation of this salt as a test for cocaine in as dilute solutions as 1 : 1,000. The test of identity is applied by dissolving 0.05 gm. cocaine hydrochlorate in 5 c.c. water and adding five drops of a five per cent. chromic acid solution; each drop forms a decided precipitate, which, however, again dissolves; after the addition of 1 c.c. pure concentrated hydrochloric acid an immediate orange-yellow precipitate of cocaine chromate should appear.—Pharm. Ztg., 1889, 697.

Caffeine—Solvent Action of Antipyrin.—A very similar observation to that made by several authors respecting the solubility of quinine salts (see Proceedings, 1889, 697, and in this Report) appears to have been made respecting caffeine by Crinon, who reports, that by adding to caffeine an amount of antipyrin slightly in excess of its weight, it becomes perfectly soluble in water without the aid of heat. With heat he dissolved 50 cgm of caffeine in 10 gm. of distilled water after adding 75 cgm. of antipyrin, and the solution remained limpid. The author adds that if the caffeine be prescribed for neuralgia or hemicrania, the antipyrin associated with it will aid in producing the desired effect.—Amer. Jour. Pharm., April 1890, 182.

Caffeine—Administration.—Dr. Misrachi uses Tanret's formula for the administration of caffeine in puerperal hemorrhage. It is given as follows: Benzoate of sodium, 3 gm.; caffeine, 2.50 gm.; distilled water, 6 gm., or q. s. to make 10 c.cm. The solution is to be made with warm water; each c.cm. contains 25 cgm. of caffeine. Sixty to eighty cgm. of caffeine injected hypodermically is said to arrest post-partum hemorrhage with great rapidity.—Amer. Jour. Pharm., March 1890, 134; from Nouv. Arch. d' Obstet.

Caffeine Tri-iodide—Two Atoms of Iodine in Loose Combination.—P. W. Squire communicates the results of experiments which confirm the views of Tilden that caffeine tri-iodide—so-called—is really an iodinated compound of the normal hydriodide (or hydriodate). The constitution of the body may be shown by either of the three following methods: (1) By treatment with cold water iodine is liberated to the extent of 42 per cent. (two-thirds of the whole), and may be titrated by hyposulphite. (2) By treatment with caustic soda, five-sixths of the "free" iodine is converted into iodide, and one-sixth into iodate of sodium; so that of the total iodine, eight-ninths (57.28 per cent.) is precipitated by silver nitrate from a solution containing excess of ammonia (in which silver iodate is soluble), and the remaining ninth (7.13 per cent.) on the addition of sulphurous acid, the theoretical percentages being 57.02 and 7.12 respectively. (3) By treatment with water and carbon bisulphide, or by boiling with water alone, the loosely combined iodine may be removed, and on evaporation the colorless liquid yields crystals of the ordinary hydriodide.

A complete synthesis of the salt has been effected by dissolving the theoretical quantities of caffeine and free iodine in hot hydriodic acid, previously saturated in the cold with the "tri-iodide," when the theoretical quantity of this di-iodo-hydriodide crystallized out on cooling.—Chem. and Drugg., May 10, 1890, 636.

Diuretin—A Sodio-Salicylic Compound of Theobromine.—Under the name "diuretin," a sodio-salicylic compound of theobromine, corresponding to one of the so-called soluble salts of caffeine, has been introduced as an advantageous diuretic. Dr. Gram states that theobromine is a diuretic, acting directly upon the kidneys, differing from caffeine in not affecting the central nervous system, and therefore not causing sleeplessness and restlessness. It is said to have produced satisfactory diuresis in cases of renal and heart disease, in which digitalis and strophanthus have been without effect. But as the free alkaloid requires about 1600 parts of water for its solution, it is not readily absorbed, and gives rise to disturbance of the stomach. Diuretin, on the other hand, is alleged to produce the beneficial effects of theobromine without the unpleasant symptoms. It is described as occurring as a white powder containing 50 per cent. of theobromine, dissolving with the aid of heat in less than half its weight of water, and remaining in solution after the liquid has cooled. It is administered to the extent of about six grams daily in one gram doses.—Pharm. Jour. and Trans., Dec. 28, 1889, 501; from Apoth. Ztg., Dec. 14, 1889, 1338.

Pilocarpine—A Specific in Jaundice.—Witkowski considers pilocarpine to be almost a specific in jaundice—so much so, indeed, that if after treatment, lasting from ten to sixteen days, the jaundice does not disappear, he would attribute it to malignant disease. He has administered it subcutaneously in thirty cases, injecting ⅙ grain once or twice a day, and only failed to remove the jaundice in one case, in which the jaundice was accompanied by a tumor of the liver. He therefore recommends its use in all cases where the condition of the heart will admit it.—Pharm. Jour. and Trans., March 1, 1890, 711; from Therap. Gaz., Jan. 1890, 46.

Physostigmine—Modification of the B. P. Test.—John C. Umney finds that the pharmacopœial test for physostigmine is inaccurate in one particular, and needs revision. This test reads as follows: "The aqueous solution has an alkaline reaction; when warmed with or when shaken with dilute solution of potash becomes red, and when evaporated to dryness over a water-bath leaves a bluish residue, the acidified solution of which is beautifully dichroic, being blue and red." The first and second tests were found perfectly satisfactory, but the last was quite the reverse. The aqueous solution neither left a bluish residue nor was its acidified solution in the slightest degree dichroic. He finds that the presence of ammonia is necessary to develop the color in the acidified solution subsequently, and he suggests that the test should be modified to read in future: "When evaporated to dryness over a water-bath *with ammonia*, leaves a bluish residue, the acidified solution of which is beautifully dichroic, being blue and red."—Pharm. Jour. and Trans., June 28, 1890, 1061.

Eserine Salicylate—A Substitute for the Sulphate.—The sulphate of eserine being deliquescent and consequently difficult to weigh, Petit proposes to substitute for it the salicylate of eserine, which crystallizes well, and remains unchanged for an indefinite period.—Amer. Jour. Pharm., March 1890, 133; from Jour. de Phar. et de Chim., Dec. 1889.

Emetine—Alkalimetric Titration.—Thos. P. Blunt records some experiments made with the view to the alkalimetric determination of emetine.

He found in this connection that if Kuntz's formula for emetine be taken as the basis of calculation ($C_{30}H_{40}N_2O_5=508$), and if this be regarded as a molecule of monad functions, each c.c. of $\frac{1}{50}$ Normal soda should be equal to 0.01016 gram of alkaloid. The amount actually found, however, approaches twice this quantity, and as examination demonstrated the absence of free alkali, the inference seems indicated that Kuntz's molecule acts as dyad. The author thinks that emetine may be correctly estimated by a method which he describes as follows:

A solution of emetine was prepared containing 0.7 per cent., calculated as 0.69 per cent. of the pure alkaloid. Measured portions of this solution were treated with 10 per cent. carbonate of soda solution until a faint permanent precipitate appeared, then ten more drops of the solution were added and about 10 c.c. of chloroform. The whole was well and repeatedly agitated in a separator, and the chloroform drawn off when quite clear; 10 c.c. more chloroform were then poured into the separator, agitated, and separated as before. The whole of the chloroform was now transferred to a clean separator and well shaken with 5 c.c. decinormal sulphuric acid and 15 c.c. of distilled water; it was drawn off, and the acid liquid decanted into a dish. The chloroform was then returned to the separator, shaken with a little distilled water, drawn off, and the water poured into the dish with the rest of the acid; finally the acid was titrated as usual with $\frac{1}{50}$ normal soda. The results were as follows:

Quantity of solution taken.	Saturating power in terms of 1–50 normal soda.	Alkaloid found.	Alkaloid calculated.
10 c.c.	13.3 c.c.	0.068	0.069
8 c.c.	11.2 c.c.	0.057	0.055

Chloroform was selected as the solvent, and carbonate of soda as the precipitant, after a considerable number of trials. Ether seemed preferable from the point of view of manipulation, as it is better for the solvent to remain in the separator, the risk of loss being thus avoided and rinsing being more conveniently carried out; its solvent action on the emetine is however much too slow, a large number of shakings being required for complete extraction.

Both ether and chloroform were found by blank experiments to dissolve the caustic alkalies in quantities sufficient to vitiate the subsequent titration, but carbonate of soda seems to be quite insoluble in chloroform.—Pharm. Jour. and Trans., April 5, 1890, 809.

Ulexine—Probable Identity with Cytisine.—Professor Kobert directs attention to the close resemblance of the physical and chemical properties attributed to cytisine, the alkaloid from the laburnum, with those of ulexine, the alkaloid from *Ulex europæus*, as described by Messrs. Gerrard and Symons (see Proceedings 1889, 712). Cytisine, like ulexine, is described as a very strong base, precipitating alkaloids from solutions of their salts and liberating ammonia from its compounds. As in the case of ulexine also, nitrate of cytisine gives with concentrated sulphuric acid a yellow red color, and both bases and their salts give with ferric chloride a yellow red color that disappears upon dilution with water. The melting point of cytisine is given as 151° C., or the same as that of ulexine; both bases are insoluble in anhydrous ether, but readily soluble in warm amylic alcohol; their hydrochlorates are very deliquescent and their nitrates crystallize well. In addition, the formula attributed to cytisine by Husemann and Marmé ($C_{20}H_{27}N_3O$) approximates to double that suggested by Gerrard and Symons for ulexine ($2C_{11}H_{14}N_2O = C_{22}H_{28}N_4O_2$), and Professor Kobert thinks that this difference might disappear if the two substances were analyzed by the same hands. The chemical and physical resemblance of the two alkaloids suggested their comparison pharmacologically, and so far as the experiments have been carried the results have corresponded exactly, qualitatively and quantitatively. When injected subcutaneously even in small doses they produce in warm-blooded animals a perceptible increase in the blood pressure, and both alkaloids are quickly absorbed and very rapidly eliminated with the urine. As the diuretic action of ulexine and cytisine depends upon increased blood pressure, due to stimulation of the vaso-motor centre only, whilst the heart is not affected, they cannot take the place of digitalis.—Pharm. Jour. and Trans., May 31, 1890, 978; from Deut. Med. Woch., May 8, 1890, 406.

Referring to the above observation of Prof. Kobert, A. W. Gerrard and W. H. Symons communicate some physical differences, which, if the properties assigned to cytisine are correct, prove them, in their opinion, to be separate bodies, even if the chemical evidence is not considered sufficient to show them to be distinct alkaloids. These differences are tabulated as follows:

CYTISINE. $C_{20}H_{27}N_3O$.	ULEXINE. $\frac{1}{2}C_{22}H_{28}N_4O_2$.
Permanent in air.	Very hygroscopic.
Sublimes completely, forming splendid crystals.	Refuses to sublime in air without decomposition, and when heated *in vacuo* does not sublime to any extent at 225° C.
Scarcely soluble in chloroform.	Freely soluble in chloroform.
Formula weight 324.41.	Formula weight × 2, 379.34.

These results, as regards ulexine, they have carefully repeated, and have made the test *in vacuo* even more severe by enclosing the alkaloid in a vacuous tube bent twice at right angles and surrounding one limb with small fragments of ice, while the other containing the alkaloid was immersed with a thermometer in a double bath of syrupy phosphoric acid, which they find to be the best liquid for high temperature work. Only a few small crystals were formed above the heated portion of the tube. The temperature of the bath was slowly raised to about 300° C., when the alkaloid appeared to boil; it gave off bubbles of gas, and a small quantity of colorless liquid distilled over. When cooled by ice and opened under mercury the tube was found to contain a considerable quantity of carbon dioxide. This, they think, proves that neither in air nor *in vacuo* can ulexine be sublimed unchanged.

That ulexine and cytisine have much in common, there can be no doubt, but so they have with eserine and sparteine, both of which are alkaloids obtained from plants belonging to the same natural order, and in percentage composition they are not far removed from pyridine, nicotine and pilocarpine. The authors are at present engaged on the preparation of cytisine, and hope to soon report the results of their examination of this alkaloid.—Pharm. Jour. and Trans., June 14, 1890, 1017.

Fumarine—Preparation and Characters.—Rudolph Reichwald reviews the older methods and gives the details of his own for preparing *fumarine* from *Fumaria officinalis*. Fumarine is readily soluble in chloroform, less readily in benzene, sparingly in water, alcohol, ether and petroleum ether. It gives a splendid violet color with strong sulphuric acid. If covered with Froehde's reagent it turns violet and then dark-green; with vanadic sulphuric acid it becomes a persistent emerald-green, turning after some hours to a more yellowish shade. It forms salts with acids, and is precipitated by the usual alkaloid reagents.—Zeitschr. Anal. Chem., 1889, No. 5, 622; from Pharm. Zeitschr. Russ., 28, 161.

Taxine—Characters, etc.—A. Hilger and Fr. Brande, after reviewing the literature on the examination of *Taxus baccata*, describe their work on the ethereal extract from which they isolated the alkaloid by the process of Marmé (Medicin. Centralb., xiv., 97.). Leaves and fruits were extracted several times with ether, the latter recovered, the residue treated a few times with acidulated water and the alkaloid precipitated with ammonia. The powder was dried in a desiccator over sulphuric acid. It is easily soluble in alcohol and ether, but could not be obtained in a crystalline state. Concentrated sulphuric acid gives a red color, while hydrochloric, nitric and phosphoric acids give none. The most of the alkaloidal reagents yield amorphous precipitates; platinum and gold chlorides give no precipitates; with Froehde's reagent a red violet color was obtained. The salts prepared are the following: acetate, oxalate, tartrate, chloride, sulphate and the platinum and gold double salts. The formula of the alkaloid is $C_{37}H_{52}O_{10}N$.—Amer. Jour. Pharm., June 1890, 297; from Ber. d. Deutsch. Chem. Ges., 1890, 464.

Damascenine—A Fluorescent Alkaloid from Nigella damascena.—Dr. Schneider has succeeded in isolating the fluorescent body which Henry Greenish some years ago observed in *Nigella damascena* (see Proceedings 1882, 211). This body is stated by Dr. Schneider to be an alkaloid, having the formula $C_{10}H_{15}NO_3$, which has been named "damascenine." It is described as occurring in well formed crystals, faintly yellowish with a bluish fluorescence, and having a peculiar narcotic odor recalling that of *Robinia Pseudacacia* or *Cytisus Laburnum*. It has an alkaline reaction and forms salts with acids, which as a rule are soluble in water, though the picrate is insoluble. The alkaloid itself is insoluble in cold water, slightly so in boiling water, and freely in alcohol, chloroform, methyl alcohol, methyl iodide, carbon bisulphide, benzine, petroleum, ether, benzol, fat oils and paraffin. All these solutions, especially when dilute, show a blue fluorescence, which in benzene in the proportion of 1 in 200,000 is still perceptible. Solutions in dilute acids are non-fluorescent, but a solution containing excess of nitric acid upon standing assumes a beautiful violet-red color comparable to methyl violet. Damascenine melts at 27° C. to a yellowish faintly fluorescent oil. It is said to be located in the husk of the seed, and the seeds are said to contain a ferment acting upon amygdalin and upon myronate of potassium.—Pharm. Jour. and Trans., May 3, 1890, 891; from Pharm. Centralh., March 27 and April 3, 1890, 173 and 191, through Pharm. Ztg., April 5, 1890, 214.

Artarine—An Alkaloid from the Root of Xanthoxylum senegalense, D. C., which see under "Materia Medica."

Urea—Estimation by Means of Hypochlorite in Place of Hypobromite.—Referring to Gerrard's method of estimating urea by means of hypobromite (see Proceedings, 1885, 335–336), D. B. Dott communicates a method in which he uses hypochlorite instead. The solution of hypochlorite is easily prepared by mixing one part of chlorinated lime with three of water, and filtering. The nitrometer is now filled with this solution, and a measured quantity of the urine (say 4 c.c.) introduced by the funnel, any small amount adhering to the sides being washed in with a few drops of distilled water. The tube is now turned over twice from its perpendicular position, in order to mix the liquids, and in a few minutes the reaction is complete. It is well to introduce a little baryta solution to make sure that all the carbonic acid is absorbed, and then a few drops of methylated spirit to remove the froth and permit the reading to be accurately made. In experiments recorded the results were practically the same as with hypobromite, but the advantages over the latter are as follows: In the first place the hypochlorite of calcium solution keeps unimpaired for a considerable time, while the sodium hypobromite rapidly deteriorates and becomes useless. Secondly, the hypochlorite solution is easily prepared, while the hypobromite solution is rather troublesome and disagreeable to make, especially where there is not a good draught. Lastly, the hypochlorite solution is much less costly than the sodium hypobromite.—Pharm. Jour. and Trans., March 29, 1890, 793.

Urea—Table Indicating Percentages on the Basis of Nitrogen Evolved.—

The "Amer. Druggist" (March 1890, 47) gives the following "Urea Table," which is based upon the amount of nitrogen evolved by means of Lunge's nitrometer from a given quantity of urine, and is intended for the convenience of the operator in making his calculations. It is presumed that the operator is familiar with the method of decomposing urea by a hypobromite, whereby it is converted into nitrogen, carbonic acid, and water, the nitrogen being evolved as gas which is subsequently measured, while the carbonic acid is absorbed by the caustic alkali of the reagent. The following points should also be understood: (1) That the whole of the nitrogen in the urea is never shown by the reaction, because a small quantity of nitrogen remains dissolved in the liquid. But the error may be disregarded if the liquid which is tested contains less than 1 per cent. of urea; and even up to near 1.5 per cent. it is not of material amount. (2) That the more urea a urine contains the less accurate become the results of the assay, unless it is diluted so as to contain about 1 per cent. of urea. And (3) That it is, therefore, best, when some accuracy is required, to obtain an approximate idea of the amount of urea by a preliminary assay, then to dilute the urine so that it will contain from 0.5 to 1 per cent. of urea, and to repeat the test.

UREA TABLE.

C.c of Nitrogen Evolved.	AMOUNT OF URINE TAKEN FOR ANALYSIS.					
	1 C.c.		2.5 C.c.		5 C.c.	
	Correspond to urea in 100 C.c.—in 1 fl.oz. of urine.		Correspond to urea in 100 C.c.—in 1 fl.oz. of urine.		Correspond to urea in 100 C.c.—in 1 fl.oz. of urine.	
5	1.35 Gm.	6.5 Gr.	. . . . . .	. . . . . .	. . . . . .	. . . . . .
6	1.62 "	7.38 "	. . . . . .	. . . . . .	. . . . . .	. . . . . .
7	1.89 "	8.61 "	. . . . . .	. . . . . .	. . . . . .	. . . . . .
8	2.16 "	9.84 "	0.864 Gm.	3.936 Gr.	. . . . . .	. . . . . .
9	2.43 "	11.07 "	0.972 "	4.428 "	. . . . . .	. . . . . .
10	2.70 "	12.3 "	1.080 "	4.920 "	. . . . . .	. . . . . .
11	2.97 "	13.53 "	1.188 "	5.412 "	. . . . . .	. . . . . .
12	3.24 "	14.76 "	1.296 "	5.904 "	. . . . . .	. . . . . .
13	3.51 "	15.99 "	1.404 "	6.396 "	. . . . . .	. . . . . .
14	3.78 "	17.22 "	1.512 "	6.888 "	. . .	. . . . . .
15	4.05 "	18.45 "	1.620 "	7.380 "	0.810 Gm.	5.690 Gr.
16	4.32 "	19.68 "	1.728 "	7.872 "	0.864 "	3.936 "
17	4.59 "	20.91 "	1.836 "	8.364 "	0.918 "	4.182 "
18	4.86 "	22.14 "	1.944 "	8.856 "	0.972 "	4.428 "
19	5.13 "	23.37 "	2.052 "	9.348 "	1.026 "	4.674 "
20	5.40 "	24.6 "	2.160 "	9.840 "	1.08 "	4.920 "
21	5.67 "	25.83 "	2.268 "	10.332 "	1.134 "	5.166 "
22	5.94 "	27.06 "	2.376 "	10.824 "	1.188 "	5.412 "
23	. . . . . .	. . . . . .	2.484 "	11.316 "	1.242 "	5.658 "
24	. . . . . .	. . . . . .	2.592 "	11.808 "	1.296 "	5.904 "
25	. . . . . .	. . . . . .	2.7 "	12.3 "	1.35 "	6.150 "
26	. . . . . .	. . . . . .	2.808 "	12.792 "	1.404 "	6.396 "
27	. . . . . .	. . . . . .	2.916 "	13.284 "	1.458 "	6.642 "
28	. . . . . .	. . . . . .	3.024 "	13.776 "	1.512 "	6.888 "
29	. . . . . .	. . . . . .	3.132 "	14.268 "	1.566 "	7.134 "
30	. . . . . .	. . . . . .	3.24 "	14.760 "	1.62 "	7.380 "
31	. . . . . .	. . . . . .	3.348 "	15.252 "	1.674 "	7.626 "
32	. . . . . .	. . . . . .	3.456 "	15.744 "	1.728 "	7.872 "
33	. . . . . .	. . . . . .	3.564 "	16.236 "	1.782 "	7.618 "
34	. . . . . .	. . . . . .	3.672 "	16.728 "	1.836 "	8.364 "
35	. . . . . .	. . . . . .	3.780 "	17.220 "	1.890 "	8.610 "
36	. . . . . .	. . . . . .	3.888 "	17.712 "	1.944 "	8.856 "
37	. . . . . .	. . . . . .	3.996 "	18.204 "	1.998 "	9.102 "
38	. . . . . .	. . . . . .	4.104 "	18.696 "	2.052 "	9.348 "
39	. . .	. . . . . .	4.212 "	19.188 "	2.106 "	9.594 "
40	. . . . . .	. . . . .	4.320 "	19.680 "	2.160 "	9.840 "
41	. . . . . .	. . . . . .	4.428 "	20.172 "	2.214 "	10.086 "
42	. . . . . .	. . . . . .	4.536 "	20.664 "	2.268 "	10.332 "
43	. . . . . .	. . . . . .	4.644 "	21.156 "	2.322 "	10.578 "
44	. . . . . .	. . . . . .	4.752 "	21.648 "	2.376 "	10.824 "
45	. . . . . .	. . . . . .	4.860 "	22.140 "	2.430 "	11.070 "
46	. . . . . .	. . . . . .	4.968 "	22.632 "	2.484 "	11.316 "
47	. . . . . .	. . . . . .	5.076 "	23.124 "	2.538 "	11.562 "
48	. . . . . .	. . . . . .	5.184 "	23.616 "	2.592 "	11.808 "
49	. . . . . .	. . . . . .	5.292 "	24.108 "	2.646 "	12.054 "
50	. . . . . .	. . . . . .	5.3 "	24.600 "	2.650 "	12.300 "

"Gm." = Gramme; "Gr." = Grain.

As the quantity of urea likely to be encountered in any urine does not go below 0.8 per cent. nor beyond 6 per cent., all figures corresponding to values outside of these limits have been omitted from the table.

The three columns giving the number of grams of urea in 100 c.c. may also be utilized to calculate the percentage of urea per weight. For this purpose it is only necessary to take the specific gravity of the urine, and to divide with it the number of grams given in the table. For instance, supposing 2.5 c.c. of urine should have evolved 18 c.c. of nitrogen, then we find from the table that 100 c.c. of the urine contained 1.944 gm. of urea. If the true percentage is wanted, supposing the urine has a specific gravity of 1.030, we divide 1.944 by 1.030 and obtain 1.887.

b. Synthetical Bases and Allied Substances.

Alkaloids—Synthetical Production.—Prof. Samuel P. Sadtler, in his introductory lecture to the 69th Course of the Philadelphia College of Pharmacy, reviews the progress made during the past six years in the synthetical production of alkaloids and allied compounds. His concise and clear review of the subject justifies his conclusions that modern organic chemistry has entered upon a very fruitful field in taking up this synthetic work, and that the problem of the constitution of the alkaloids, so long apparently incapable of solution by any methods of analysis, may yet be solved by the combination of synthetical and analytical study now entered upon. It is eminently proper that, as pharmacists first isolated the alkaloids morphine and quinine, they should be preparing actively to share the glory and profit of their artificial manufacture, which is certain to come in the near future.—Amer. Jour. Pharm., Nov. 1889, 545–552.

Methylene Blue—Anodyne Properties.—Ehrlich and Leppmann report that therapeutic experiments made in the Moabite Hospital, Berlin, prove "methylene blue" to possess valuable anodyne properties. It is given in 0.1 to 0.5 gram doses, in capsules, the highest daily dose being 1 gram. The methylene blue must be free from zinc; that is to say, it must be the free base—tetramethylthionine hydroxide—which is readily soluble both in water and in alcohol.—Pharm. Jour. and Trans., June 28, 1890, 1058; from D. Med. Woch., June 5, 1890.

Pyoktanin—A New Antiseptic.—E. Merck has introduced a new antiseptic which he has named "pyoktanin." It is one of the aniline dyes which for a long time have been known to destroy bacteria and bacilli of all kinds. The violet aniline dyes in solutions 1 : 30,000 retard the growth of bacteria and in 1 : 2,000 to 1 : 1,000 prevent putrefaction. Two dyes are at present put upon the market, a *blue* one, *Pyoktanin cæruleum* and a *yellow* one, *Pyoktanin aureum*, the former used for surgical, the latter for ophthalmic purposes. Of each can be obtained, dusting powders 1 and 2 per cent., ointments, pencils, pastilles for making solutions, and dressings 1 per cent. The experiments leading to the discovery of the value of these preparations were made by Prof. Stilling of Strassburg.—Amer. Jour. Pharm., June 1890, 295; from Pharm. Ztg., 1890, 261.

Quinoline—Use as a Preservative Agent.—Rosenthal calls attention to the value of solutions of quinoline for the preservation of anatomical specimens. Aqueous solutions of the hydrochlorate, tartrate and salicylate, containing equal to 0.1 to 0.2 per cent. of the base, are said to have proved very effective for the purpose. The hydrochlorate is, however, preferred, the solution being prepared by suspending a weighed quantity of quinoline in water and adding dilute hydrochloric acid, with continual stirring, until all the quinoline is dissolved. Should an excess of acid be used, this may be neutralized with weak soda liquor and the solution then diluted to the required strength. The formula adopted in the Erlangen physiological institution is: Quinoline, 5 grams; sodium chloride, 6 grams; glycerin, 100 grams; water, 900 grams. The ordinary tar quinoline can be used. The liquid is said to have the advantage of preserving all the tissues in their natural condition, except that it removes from them all coloring matter. Quinoline is also said to be a convenient preservative for digestive liquids, as an addition of it, in the form of salicylate, whilst preventing any putrescence, does not in the least interfere with the activity of the digestive ferment.—Pharm. Jour. and Trans., Dec. 1889, 502; from Münch. Med. Woch., Dec. 3, 1889, 868.

Pyrodine—Necessity of Caution in Its Use.—According to Guttman, pyrodine, or acet-phenylhydracine, should be administered only under great precautions, from the facts that it may be toxic in very small doses, and that it attacks the blood globules. He advises that the quantity administered daily do not exceed 10 cgm. (taken in one or two doses), that is, if the treatment is to be prolonged. He thinks, however, that treatment with pyrodine should not continue for more than three days. Dr. Lemoine has also stated that the daily dose should be 10 cgm., and should never exceed 15 cgm., adding that 25 cgm. had given rise to grave toxic symptoms.—Amer. Jour. Pharm., Sept. 1889, 472; from Rép. de Pharm., June 1889.

Hydracetin (Pyrodine)—Characters, Dose and Uses.—Guttman proposes the name "*hydracetin*" for *pure acetphenylhydrazid*, $C_6H_5NHNH(C_2H_3O)$, which has heretofore been used in an impure condition under the name of *pyrodine* (see Proceedings 1889, 721–722). It forms a white, crystalline, odorless and almost tasteless powder, difficultly soluble in water (1 : 50), easily soluble in alcohol, and possesses even in small doses decided antipyretic action. The dose should not exceed 0.1 gm. per day, best given in two doses of 0.05 gm. each. Hydracetin is a powerful reducing agent, especially on warming and in presence of alkalies; cupric solutions deposit cuprous oxide; silver and platinum solutions deposit metallic silver and platinum; mercuric solutions and ferric salts are reduced to mercurous and ferrous salts; potassium permanganate is decolorized. A fine carmine-red color is obtained by dissolving hydracetin in a mixture of concentrated H_2SO_4, ninety-eight parts, and HNO_3, two parts. The medicinal effects of this remedy are thought to be caused by its strong reducing action; it has also been successfully used as ten per cent. ointment in the treatment of psoriasis.—Pharm. Centralhalle, 1889, 311 and 341.

Acetylphenylhydrazine—Derivatives.—Petit has prepared several derivatives of acetylphenylhydrazine by a less complicated process than that usually employed. He causes sodium to act directly upon acetylphenylhydrazine, which he then treats with iodide of methyl, thus obtaining methylacetylphenylhydrazine. By replacing the iodide of methyl with the iodide of ethyl, he obtained ethylacetylphenylhydrazine. In the same way he prepared formylphenylhydrazine.—Amer. Jour. Pharm., Jan. 1890, 20; from Bull. Soc. de. Pharm. de Paris, Oct. 2, 1889.

Acetylethylenphenylhydrazin and Ethylenphenylhydrazinsuccinic Acid—Two New Antipyretics.—Dr. Michaelis has applied for patents for the preparation of *acetylethylenphenylhydrazin* and *ethylenphenylhydrazinsuccinic acid*, which will soon be introduced and claim the attention of practitioners. The former is prepared by dissolving ethylenphenylhydrazin in an excess of acetic anhydride, and boiling for a short time, after cooling acetylethylenphenylhydrazin crystallizes out, and is purified by recrystallization from alcohol; it forms colorless needles, melting at 222° C. Ethylenphenylhydrazinsuccinic acid is made by dissolving equal parts by weight of ethylenphenylhydrazin and succinicanhydride in alcohol, boiling for a short time, when a crystalline mass of the compound is formed which is purified by washing with alcohol. It is soluble in hot water, slightly soluble in alcohol, easily soluble in solution of sodium carbonate, from which the acid is reprecipitated by addition of hydrochloric acid; it melts at 303° C.—Oesterr. Ztsch. f. Pharm., 1889, 649.

Orthrine—A New Antipyretic.—Under the name "orthrine" Prof. Kobert recommends as an antipyretic a new derivative of phenylhydrazin, which has been obtained by the combination of hydrazin with paraoxybenzoic acid. This new body,

Orthohydrazin-para-oxybenzoate, is very unstable, but unites with hydrochloric acid, forming the hydrochlorate of orthrine, which is stable. Clinical experiments made with the new antipyretic by Prof. Unverricht, show that, in 30 to 50 c.c. doses, orthrine acts in typhoid fever, pneumonia and articular rheumatism generally with great energy; but it is uncertain, and its advantages are slight compared with its disadvantages, amongst which are profuse perspiration, collapse, and symptoms of intoxication. Michaelis has recently mentioned two other hydrazin derivatives which possess antipyretic properties; these are acetyl-ethylenphenylhydrazin,

$$(C_6H_5)_2N_2.C_2H_4.N_2.2H(CO.CH_3),$$

and ethylenphenylhydrazin succinic acid,

$$(C_6H_5)_2—N_2—N_2.—2H(CO.C_2H_4.COOH).$$

These two substances are yet on clinical trial, and it is to be hoped that they will have shorter names if they are to go down to posterity.—Amer. Drugg., April 1890, 67; from Chem. and Drugg.

Antipyrin—Incompatibles.—In view of the increased employment of antipyrine in medicine, and its now established value as a therapeutic agent, E. J. Millard and A. Campbell Stark have made a systematic inquiry into its properties, and communicate the following list of drugs and their preparations which they have found to be incompatible with antipyrin. Some of them have been previously announced by others, but they have in all cases verified the statements already made concerning them, and in some have studied further the nature of the reactions that take place.

Acid. carbolic., precipitated with strong solution.
Acid. hydrocyan. dil., yellow coloration.
Acid. nitric. dil., faint yellow coloration.
Acid. tannic., white insoluble precipitate.
Alumen (ammonia), deep yellow coloration, fading and precipitating.
Amyl nitrite (acid), green coloration.
Arsen. iodid., precipitates.
Chloral hydras, precipitates in strong solution, no apparent action in dilute.
Cupri sulphas, solution turns green.
Dec. cinchonæ, precipitates.
Ext. cinch. liq., precipitates.
Ferri sulph., brownish-yellow color, deposits on standing, and solution turns red.
Glycerin. acid. carbolici, precipitates.
Glycerin. acid. tannici, precipitates.
Hydrarg. perchlor., precipitates, soluble in excess of water.
Inf. catechu conc., precipitates.
Inf. cinch. acid., precipitates.
Inf. rosæ acid., precipitates.
Inf. uvæ ursi, precipitates.
Liq. arsenii et hydrarg. iod., precipitates.
Liq. ferri perchlor.
Liq. ferri pernit. } Blood-red coloration.
Liq. ferri persulph.
Liq. potass. permang., reduction quickly takes place.
Sodii salicylas (solid), liquefies.
Spirit. ætheris nit. (acid), green coloration.
Syrup. ferri iodid., reddish brown coloration.

Tinct. catechu, precipitates.
Tinct. cinchonæ, precipitates.
Tinct. cinch. co., precipitates.
Tinct. ferri perchlor., red coloration.
Tinct. gallæ, precipitates.
Tinct. gum rubri, precipitates.
Tinct. hamamelid., precipitates.
Tinct. iodi, precipitates, soluble in excess of water.
Tinct. kino, precipitates.
Tinct. laricis, precipitates.
Tinct. rhei, precipitates.

—Pharm. Jour. and Trans., April 19, 1890, 860–863.

Antipyrin—Incompatibles.—A writer in "British Medical Journal" (Nov. 16, 1889) calls attention to some incompatibles of antipyrin. If liquid extract of cinchona be added to a solution of antipyrin in distilled water, a dense reddish-brown precipitate is formed, which contains tannic acid and antipyrin. The greater part of this precipitate dissolves on the addition of dilute sulphuric acid, the insoluble portion being probably the coloring matter of the bark, for if a solution of tannic acid be used instead of the liquid extract of cinchona as a precipitating agent, a precipitate forms which entirely and easily dissolves on the addition of the dilute sulphuric acid. It follows, therefore, that decoctions, infusions, and tinctures containing tannic acid should act in the same manner. The effect, however, produced by these preparations is very small compared with the liquid extract of cinchona. Antipyrin is not precipitated by solutions of the alkaloids quinine, cinchonine, or cinchonidine. Therefore, it can be prescribed in a mixture containing sulphate of quinine and dilute sulphuric acid. When strong solutions of chloral hydrate and antipyrin are mixed, a white precipitate is formed, which soon becomes resolved into globules of oily-looking liquid, which sink to the bottom in a distinct layer. This layer, in the course of some hours, changes into a crystalline mass, from which the clear upper liquid can be drained off. These crystals are soluble in water, but considerably less so than either antipyrin or chloral hydrate. They have a distinct taste of chloral without its pungency, and they are not so bitter as antipyrin. This precipitation does not occur in dilute solutions, and it is possible to mix a solution containing sixty grains of antipyrin to the fluidounce with one containing the same proportion of chloral hydrate, without any precipitate being immediately formed, although in a few hours small crystals begin to appear (see also *Chloral Hydrate).*—Amer. Jour. Pharm., March 1890, 147–148.

Antipyrin—Hæmostatic Properties.—Dr. Moncorvo regards antipyrin as possessing valuable hæmostatic properties, probably acting both by constricting the vessels and coagulating the blood.

Thalline possesses identical hæmostatic properties, but

Acetanilid and

Phenacetin do not possess much hæmostatic power.—Amer. Jour. Pharm., April 1890, 165; from Jour. de Méd. de Paris.

Antipyrin—Poisonous Effect.—Dr. Schwabe reports a case where violent toxic symptoms were observed in a young woman who had been ordered antipyrin in one-gram doses for severe neuralgic pain. The symptoms were oppressive pain in back of head, followed by ringing in the ears, giddiness, feeling of anxiety; then tumultuous heart-beat, difficulty of breathing, cold sweat, strong feeling of heat on the right side of the body, cold and numbness on the left. The sight and speech were transiently affected. Recovery complete after two days.—Pharm. Jour. and Trans., June 28, 1890, 1059; from Apoth. Ztg., June 14, 1890, 322.

Antipyrin—Substitution by Antifebrin.—The "Pharm. Era" (August 1889) calls attention to complaints from some of its correspondents that antifebrin has been substituted for antipyrin. While there may be some slight danger to mistake the one of these antipyretics for the other, the true pharmacist will be protected from such danger, and will be proof against the temptation to disregard the differences between them. It is his duty, his instinct, to respect all differences of identity of medicines. And speaking of the multiplicity of antipyretics and new chemicals that have in recent years been introduced, and the difficulty of distinguishing between some of them in a chemical way, the editor, very properly, remarks that "when a new chemical is ordered of the pharmacist, it is to be furnished as the current article *designated in the order.* The pharmacist may be placed under difficulties, it is true, when synonyms abound, but these difficulties must be surmounted."

Antipyrin—Compound with Carbolic Acid.—Tardy observes that a solution of antipyrin, to which solution of carbolic acid was added, separated, after some hours, into two layers. The upper layer, which was limpid, having been decanted, was found to have only the taste of antipyrin, and did not contain any carbolic acid. The lower layer, which was an oily liquid, contained both antipyrin and carbolic acid. It had a piquant taste, a faint rose color, a slight odor of phenol, and a sp. gr. of 1.13; it was neutral, insoluble in water, and soluble in alcohol and in ether.—Pharm. Jour. and Trans., May 31, 1890, 977; from Rép. de Pharm., May 10, 1890, 209.

Salicylate of Antipyrin—Production, etc.—Professor Spies has succeeded in preparing a well crystallized compound, which he considers to be a salicylate of antipyrin. It is obtained by adding to a boiling very dilute aqueous solution of antipyrin, in small portions at a time, a molecular proportion of salicylic acid (100 of antipyrin to 73.4 of salicylic acid). If the quantity of water be sufficient, the liquid when boiling is clear, but if not a portion of the new salt is thrown out as a yellowish oil. In either case, upon slow cooling of the liquid, there is first an appearance in it of a certain milkiness, and then of the well-crystallized salt. When, through deficiency of the solvent, the oily separation takes place, this forms upon cooling a yellow crystalline mass, which should be crystallized from a larger quantity of water. The salt occurs in fine crystalline scales, or in flocks formed of very much elongated crystals, the scales tending to group round a centre. Separately, the crystals are colorless and transparent, but in the mass they are white. They are very slightly soluble in cold water (1 in 250), more soluble in hot water, and freely soluble in alcohol, ether, chloroform, ether and carbon bisulphide. The solutions manifest a faintly acid reaction, and have a taste sweet at first and then bitter. The crystals melt at 89°–90° C., above which temperature they decompose. Left at ordinary temperatures in a vacuous space, they do not sensibly diminish in weight, and on analysis give results corresponding with the formula $C_{11}H_{12}N_2O.C_7H_6O_3$.—Pharm. Jour. and Trans., June 28, 1890, 1058; from L' Osori, May 1890, 920.

Salicylate of Antipyrin—Simple Method of Preparation—Dr. Schlovien states that salicylate of antipyrin has been used in the Berlin hospital under the name of

"*Salipyrin Riedel.*" The therapeutic results are favorable. Dr. Schlovien states that a simple way of preparing the compound is to heat antipyrin and salicylic acid together in molecular proportions, with or without water, in a vapor bath. The mixture melts to an oil, which upon cooling solidifies and is recrystallized from alcohol. Another method is to shake an aqueous solution of antipyrin with an ether solution of salicylic acid, when the compound, which is almost insoluble in water and with difficulty in ether, separates slowly in handsome crystals.—Ibid., 1059.

Antipyrin and Chloral Hydrate—Priority of Discovery of Their Combination.—Behal and Choay have put forward a reclamation of priority of the discovery of the compound formed by antipyrin and chloral hydrate. They point out that in the Paris Exhibition (1889) two such compounds were exhibited, and that the compound described by Reuter is a third modification that no longer gives the reactions of antipyrin. The authors describe these compounds, which they have named respectively "monochloralantipyrin" and "dichloralantipyrin."

Monochloralantipyrin, ($C_{13}H_{13}N_2Cl_4O_2$), is obtained in large crystals by heating 4.7 grams chloral hydrate and 5.3 grams of antipyrin with 5 grams of water. It is soluble to the extent of 7.85 grams in 100 grams of water. It melts at 67–68°.

Dichloralantipyrin is obtained when an excess of chloral hydrate is used. It separates from an oily layer, formed in prismatic needles, and contains 2 mol. of chloral to 1 mol. antipyrin. Its melting point is the same as that of monochloralantipyrin, but it is somewhat more soluble in water, viz.:

9.98 grams in 100 grams of water at 14° C., undergoing, however, some degree of dissociation.—Pharm. Jour. and Trans., May 31, 1890, 977; from Jour. de Pharm. et de Chim., May 15, 1890, 539.

Hypnal—A Compound of Antipyrin and Chloral hydrate.—The observation that antipyrin and chloralhydrate are incompatible has led to further investigation. Reuter has recently obtained a crystalline compound of the two, which he has named

Trichloraldehydphenyldimethylpyrazol, and alleged it to be without therapeutic value. Dr. Bardet, however, finds this compound, which he proposes to name

Hypnal, to partake in a marked degree of the properties of both its constituents. Administered in 22 cases in doses of one gram (rarely two grams) he found it to induce sleep as readily as chloral hydrate, whilst in those instances where the insomnia was caused by pain it seemed to have the same anodyne effect as antipyrin. It consists according to Dr. Bardet of about 45 per cent. of chloral and 55 of antipyrin. According to Bounet, if concentrated solutions of the two constituents are mixed, the new compound crystallizes out, and may be obtained pure and in enormous transparent rhombic crystals by recrystallization from water. It is said to dissolve in 6 to 8 times its weight of warm water, and melts at 58° to 60° C. While described as tasteless by Bounet, Dr. Bardet says that it has a saline taste, free from bitterness, but leaving a slight sensation similar to chloral upon the tongue.—Pharm. Jour. and Trans., May 3, 1890, 889; from Nouv. Rem., March 24, 1890, 135.

Exalgine—Preparation and Characters.—According to E. Ritsert exalgine (*ortho-methylacetanilid* $C_6H_5N(CH_3)C_2H_3O$) is prepared by the action of acetylchloride C_2H_3OCl upon monomethylaniline $C_6H_5NHCH_3$ there being also produced methylaniline chlorhydrate $C_6H_5NHCH_3,HCl$. It is obtained in white crystals melting at 100°, boiling at 245° C., easily soluble in alcohol, difficultly soluble in water. Among its tests may be noted: (1) If exalgin be boiled with solution of potassium hydrate, allowed to cool, diluted with water, and a little fresh chlorine water now added, the solution becomes transiently cloudy, then for one to two minutes colorless, after which it assumes a pure blue color; acetanilid in the same manner forms an orange-red color. This test allows the detection of acetanilid in exalgin. (2) The simplest test by which exalgin can be distinguished from acetanilid, phenacetin and methacetin, depends upon the solubility in HCl and the behavior upon addition of concentrated nitric acid: 0.1 gram exalgin dissolves easily in 1 c.c. concentrated HCl (phenacetin is insoluble) and is not reprecipitated (acetanilid); the solution should remain colorless on addition of one drop of concentrated nitric acid (methacetin causes a red-brown coloration).—Pharm. Ztg., 1889, 754.

Exalgin (Ortho-Methylacetanilid)—Distinctions from Strychnine.—

Jouisse points out certain distinctions between exalgin and strychnine, as follows: *Exalgin*—an odor of raspberry, increasing with heat; no bitter taste; causes anæsthesia on the point of the tongue; on trituration the raspberry odor is disengaged; a solution of tannic acid added to a solution of exalgin gives no precipitate. *Strychnine*—a slight ethereal odor; bitter taste without anæsthesia; trituration gives an odor as of scorched bread; tannic acid solutions give flocculent precipitate; with permanganate of potash (the mixture being treated with sulphuric acid) strychnine gives an orange color, turning to a brick red. Exalgin gives a brown color which so remains, although it gets gradually paler. The writer presents these reactions in the fear that strychnine and exalgin may be mistaken for each other on account of the close resemblance of their crystallized preparations. The author also recommends a *mixture of exalgin* (see under "Pharmacy"), as an agreeable and permanent preparation.—Amer. Jour. Pharm., Aug. 1889, 417; from Nouv. Rem., July 8, 1889.

Exalgine—Distinction from Acetanilid and Phenacetin.—According to E. Hirschsohn exalgin may be distinguished by the following simple test from acetanilid and phenacetin: 1 gram is dissolved in 2 c.c. chloroform (acetanilid requires 6 c.c. and phenacetin 20 c.c. chloroform) and 20 c.c. petroleum ether (specific gravity 0.650) added: the solution should remain clear. 10 per cent. phenacetin and 20 per cent. acetanilid can be detected by the formation of a precipitate after standing a short time.—Pharm. Ztschr. f. Russl., 1890, 17.

Exalgine—Administration.—The formula used by Dr. Dujardin-Beaumetz for the administration of exalgin, is given as follows: Exalgin, 2.50 gm.; tr. orange, 5 gm.; water, 120 gm.; syrup of orange-peel, 30 gm. A tablespoonful (containing 25 cgm. of exalgin) may be given morning and night. Desnos is said to have given 1.50 gm. of exalgin without causing disturbance. According to Dr. Dujardin-Beaumetz, this substance "is very active against the element of pain, whatever may be its origin, and is especially useful in essential or sympathetic neuralgia, tabetic pains and angina pectoris."—Amer. Jour. Pharm., March 1890, 134.

Acetanilid—Poisonous Action.—The "Pharm. Ztg." (June 21, 1890, 386) calls attention to two cases of poisoning by acetanilid. In the first case, where a student took 29 grams, it was followed by the characteristic symptoms of aniline poisoning. In the second case 30 grams had been taken by a woman with suicidal intent. The editor points out in this connection that most of the acetanilid of commerce is contaminated by impurities, and suggests that experiments should be made with acetanilid that has been purified by treatment with potassium permanganate.—Pharm. Jour. and Trans., June 28, 1890, 1059.

Acetanilid, Methacetin and Phenacetin—Distinctive Tests.—E. Ritsert has applied the following tests to acetanilid, methacetin and phenacetin, with the results shown in the table below:

(1) 0.1 gm. with 1 c.c. cold concentrated hydrochloric acid. (2) After observing the results of test 1, add one drop of concentrated nitric acid. (3) 0.1 gm. boiled with 1 c.c. concentrated hydrochloric acid, allowed to cool, diluted with water and 3 drops of a 3 per cent. chromic acid solution added. (4) 0.1 gm. with 5–6 c.c. cold concentrated hydrochloric acid and 1 c.c. of the 3 per cent. chromic acid solution. (5) 0.1 gm. boiled with 1 c.c. solution of potassium hydrate, allowed to cool and 5–8 drops of $\frac{1}{10}$ normal potassium permanganate solution added.

	I	II	III	IV	V
Methacetin.	Soluble.	Slowly reddish brown	Blood red.	Immediately green.	Green, then yellowish brown.
Phenacetin.	Insoluble.	Slowly yellow	Blood red.	Yellow, after a few minutes green.	Dark green.
Acetanilid.	Soluble, but re-precipitated.	Colorless.	Yellow.	Yellow; only after some hours green.	Dark green with disagreeable odor of carbylamin.

In this connection mention was also made of the *melting-point of acetanilid*, commercial specimens melting at 111°, 112°, 113°, 114°, and as high as 125° C. The melting point is stated by different authorities from 113° to 115°; the wide limits here recorded are produced by admixture of acet-toluid.—Pharm. Ztg., 1889, 546.

Phenacetin—Detection of Antifebrine.—To detect antifebrine in phenacetin, J. Schroeder boils 0.5 gm. of the sample in 5 to 8 c.c. water, cools, and filters. The filtrate is boiled with dilute nitric acid to which a little potassium nitrate has been added; a few drops of nitric acid containing nitrous acid are added, and the liquid is boiled again. Pure phenacetin undergoes no change, but if 2 per cent. of antifebrin are present there is distinct reddening.—Chem. News, Aug. 30, 1889, 109; from Ztschr. Analyt. Chem., 1889, Part 3.

Orexin—A New Remedial Agent.—Prof. F. Penzoldt has given the name orexin to a new compound,—

Phenyldihydrochinazolin Hydrochlorate.—It is stated to possess true stomachic properties, not only creating an appetite, but also assisting the digestion of foods. It is further stated that the remedy apparently acts by producing local irritation, and is best prescribed in gelatin-coated pills in combination with extract of gentian; the dose being 0.3 to 0.5 gram.—Pharm. Ztg., 1890, 115.

Orexin—Administration.—H. Helbing has experimented with a view of finding an agreeable mode to administer orexin, a synthetic appetizer. It appears to be preferably given in the form of pills (containing 1½ to 2 grains each, made up with extract and pulverized gentian), which are coated with chocolate. In this manner the burning taste is entirely avoided. It is also advisable to take a quantity of liquid with each dose, to prevent any possible gastric irritation.—Chem. and Drugg., June 28, 1890, 867; from Helbing's "Record."

Orexin—Doubtful Value as an Appetizer.—In view of the claims put forward on behalf of orexin as an appetite producer, Dr. Martins has made a large number of experiments which have not afforded any distinct and indisputable evidence of the action of orexin in the direction of improving the appetite.—Pharm. Jour. and Trans., May 31, 1890, 977; from Deut. Med. Woch., May 15, 1890, 427.

Camphamine—A Basic Derivative of Camphor.—P. Cazeneuve describes a new base obtained from camphor. He heats 5 gm. of normal monochlorocamphor-*a* with 20 gm. of saturated aqueous ammonia for twenty-four hours to 180° in a sealed tube. He obtains a blackish residue. From the solution of this matter after purification he obtains a body which crystallizes in small needles radiating out from a centre. It melts at 180°, and is insoluble in water, but soluble in alcohol, ether, chloroform, and ligroine. This body is evidently of a basic nature, and its saline solutions give precipitates with all the general precipitants for alkaloids.—Chem. News, Feb. 28, 1890, 109; from Bull. Soc. Chim. Paris, ser. 3, vol. ii., No. 11.

Sulphaminol—Use in Surgery.—H. Helbing observes that sulphaminol is recommended for surgical purposes as being a sulphur compound which, in contact with animal secretions, splits up into sulphur and phenol. The researches of E. Weiss on the use of sulphaminol against the putrid brood of bees, show that while the substance is strong enough to be of service in this disease so troublesome to bee-keepers, it is quite harmless and does not kill the bees.—Chem. and Drugg., June 28, 1890, 867; from Helbing's "Record."

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Digitalin—Views Respecting its Character.—It is well known that there exists considerable diversity of opinion between French and German authorities as to the substance to which the name "digitalin" is properly applied (see Proceedings 1875, 743–745). The following opinion, representing the French view, has recently been expressed by Dr. Bardet. In the French Codex the name "digitalin" is officially applied to two preparations, one crystalline and the other amorphous, but both are required to be entirely soluble in chloroform. These preparations have been alleged by German writers to consist not of digitalin but of digitoxin, and various authorities have stated that the crystalline preparation is much more powerful than the amorphous one. Dr. Bardet, however, claims to have established experimentally that the two Codex preparations, which he speaks of generally as "chloroformic digitalin," are identical in their activity and effects, and represent the only well-defined derivative of digitalis, although he prefers the crystalline as being slightly more pure. On the other hand he says that German digitoxin, as it occurs in commerce, differs from the Codex preparations in not being completely soluble in chloroform and in being only one-half or one-third as active. The substance named digitalin in Germany is said to be an indefinite substance, resembling digitalein in being insoluble in chloroform and soluble in water, and in its action, which in both cases is variable and always much less than that of chloroformic digitalin.— Pharm. Jour. and Trans., Dec. 28, 1889, 503; from Nouv. Rém., Nov. 24, 1889, 590.

Digitalins—Comparative Activity.—G. Bardet reports some recent researches upon amorphous or crystallized digitalin—the digitoxin of German chemists—and with digitalein, which, in Germany is called digitalin. He arrived at the following conclusions: Crystallized and amorphous digitalins prepared according to the French Codex, are wholly soluble in chloroform. They have an identical activity and are uniform in their effects. The German digitoxin is incompletely soluble in chloroform, and its activity is from two to three times less than the digitalin of the codex. French digitalein and German digitalin, both of which are soluble in water and insoluble in chloroform, are not definite products. They have a like activity and therapeutic action, but the action is twenty to thirty-five times less than the digitalin of the codex or chloroformic digitalin. On the other hand, it is possible that the action upon the heart may not be exactly the same as the action of the digitalin of the codex.—Amer. Jour. Pharm., Feb. 1890, 91; from J. de Ph. et de Chim., Dec. 1, 1889.

Digitalin and Tanghinin—Decomposition Products.—Arnaud, on heating *digitalin* in a sealed tube with barium oxide and water to 180° C., obtained a crystalline compound having the composition $(C_{31}H_{51}O_{11})_2Ba$. It is insoluble in water, but somewhat soluble in boiled alcohol. It is the barium derivative of the compound $C_{31}H_{52}O_{11}$, which is formed from digitalin, $C_{31}H_{50}O_{10}$, by the assimilation of water.

Tanghinin, under similar conditions, yields a barium derivative of the compound $C_{27}H_{44}O_{10}.2H_2O$ having been assimilated, thus making the composition of tanghinin $C_{27}H_{40}O_8$.—Amer. Jour. Pharm., April 1890, 177; from Compt. rend., cix., 701.

Strophanthin and Ouabain—Local Anæsthetic Action.—Prof. Panat reports upon physiological experiments made with strophanthin and ouabain (see Proceedings, 1889, 728), as follows: "Ouabain, which possesses anæsthesic properties as applied to the eyes of rabbits, does not appear to exercise any action of this kind upon the human eye. Strophanthin has an anæsthesic action upon the human eye, but, owing to its very irritating effects, its use should give way to that of cocaine. The same is true of erythrophleine and other substances proposed to effect local anæsthesia. Thus far, cocaine alone merits the favor of ophthalmologists."—Amer. Jour. Pharm., April, 1890, 181; from Nouveaux Rem., March 8, 1890.

Andromedotoxin—Characters, and Process of Extraction from Rhododendron ponticum.—The following process was employed by Professor Plugge in the isolation of andromedotoxin from different ericaceous plants (see Proceedings 1889, 449), as applied by that author in conjunction with H. G. de Zaayer to the leaves of *Rhododendron ponticum.* The aqueous extract of the leaves was treated successively with normal and basic lead acetate. From the filtrate, the lead was separated by hydrogen sulphide, and the liquid was concentrated by slow evaporation in the air, and treated repeatedly with considerable quantities of chloroform. The residue left on evaporating the chloroform was purified by re-solution in chloroform (or alcohol) and precipitation by the addition of a considerable amount of ether. This treatment several times repeated finally yielded well-formed, crystalline needles, which melted at 228–229°. At 12.5°, water dissolves 2.81 per cent.; alcohol (of 94 per cent.) 11.1; amyl alcohol, 1.14; chloroform, 0.26; ether, 0.07; benzene, 0.004. The solutions in water, alcohol, and amyl alcohol, are lævorotatory, whilst that in chloroform is dextrorotatory. Andromedotoxin, $C_{31}H_{51}O_{10}$, is an indifferent non-nitrogenous compound; its solution in different liquids has a neutral reaction, and it is not precipitated by any of the so-called general alkaloid reagents. Its reaction with dilute and concentrated mineral acids is characteristic, as with them it gives intensely red decomposition-products. Concentrated sulphuric acid gives a dark reddish-brown, which becomes deeper red on warming, and turns light mulberry-red on dilution with water. The addition of alkali removes the color, which re-appears on acidifying. Evaporation with dilute (1 : 5) sulphuric acid gives a beautiful rose-red color. The pure material gives off no odor during this evaporation, but if not completely purified, a strong and very characteristic odor of ericinol is evolved. Evaporation with dilute hydrochloric acid gives a residue somewhat more violet-red in tint. Evaporation with phosphoric acid gives a mulberry-red residue, clearly perceptible with very minute quantities, as in the case of the other acids. The fatal dose for small animals has been found to vary from 0.1–0.45 mgm. per kilo. body-weight. No chemical antidote is known as yet.—Amer. Jour. Pharm., July 1889, 360–361; from Jour. Chem. Soc.

Echugin—A Glucose from "Echugin Poison."—R. Böhm has analyzed the echugin poison, which is a blackish-brown, crummy, odorless and intensely bitter mass, obtained from

Adenium Bœhmianum, an apocynaceous plant indigenous to the German possessions in southwest Africa. The author isolated a crystalline glucoside, echugin, and a resinous body, echugon. The glucoside crystallizes in small, colorless, satiny, rhombic plates, easily soluble in water and alcohol and insoluble in ether. It is present to about 10 per cent. in the crude substance. Echugin is a cardiac poison, death taking place in systole.—Amer. Jour. Pharm., April 1890, 176; from Centralb. f. d. Med. Wissensch., 1889, 892.

Echugin—Toxic Dose, etc.—H. Helbing draws attention to echugin, the active principle discovered by R. Böhm in an apocynaceous shrub *(Adenium Bœhmianum)* growing in Africa, the milky juice of which is used by the natives as an arrow poison. The Ovambos in southwest Africa call the plant "Exuja," hence the name of the active principle, which is a glucoside, having the formula $(C_5H_8O_2)_n$ the same as that assigned to digitalin. It more resembles ouabain and strophanthin. The toxic dose for rabbits is $\frac{1}{120}$–$\frac{1}{40}$ gr. per lb. of body weight. On higher animals it acts similarly to the above named glucosides.—Chem. and Drugg., June 28, 1890, 867; from Helbing's "Record."

Tanghinin—A New Crystalline Principle from Tanghinia venenifera.—Gley announces that he has separated from the nut of *Tanghinia venenifera* a new crystallized principle which he has named tanghinin. He exhausted the seeds of fat with sulphide of carbon and treated the residuum with concentrated boiling alcohol, finally distilling the liquid and proceeding in the usual way to obtain crystals. The substance fuses at 182° C. (359.6 F.), and, at higher temperatures, burns without ash; it is soluble in about 200 parts of water; after several hours' contact with water it swells to a thick mucilage. It is very soluble in alcohol and ether, and deflects polarized light to the left. Under dilute acids it decomposes into a resin and "a minute quantity of a very bitter substance." Like strophanthin and ouabain, tanghinin does not contain nitrogen. "It is neither," says Mr. Gley, "an alkaloid nor a glucoside." It is a powerful cardiac poison, and is used in Madagascar for the execution of criminals.—Amer. Jour. Pharm., Sept. 1889, 472; from Répert. de Phar., July 1889.

Frangulin—Preparation, Yield, etc.—T. E. Thorpe and H. H. Robinson use the following method for preparing the glucoside frangulin. The bark of *Rhamnus Frangula* is treated with low boiling petroleum ether to remove fat, and then with alcohol, which dissolves the glucoside, resin, etc. This extract is treated with lead acetate to precipitate tannin, and the liquid is freed of lead by means of sulphuretted hydrogen. Fourteen pounds of bark yielded 5½ gm. frangulin. Composition of the glucoside dried to constant weight at 120° C. is $C_{22}H_{22}O_9$. The sugar obtained from frangulin is not glucose. The other decomposition product, insoluble and of a yellow color, dried at 120° C., has the composition $C_{15}H_{10}O_5$, and is identical with emodin from rhubarb.—Amer. Jour. Pharm., March 1890, 127; from Jour. Chem. Soc., Dec. 19, 1889.

Villosin and Villosic Acid—Characters, etc.—G. A. Krauss, referring to his former paper in which he described villosin (see *Blackberry Root* under "Materia Medica"), communicates some additional observations respecting villosin, and describes its decomposition product as a white resin acid, which he has named villosic acid. Although there is no doubt that

Villosin is a glucoside, he now corrects his former statement that it will directly reduce Fehling's solution. When perfectly pure villosin does not reduce Fehling's solution, but it does it very distinctly after having been boiled with dilute HCl. In his recent experiments he has obtained much smaller yields of villosin—4 grains from 3 lbs. of the root-bark—and he has not succeeded in improving his former method. The "lime method" is also to be abandoned, because the lime appears to decompose the villosin,

Villosic acid being largely precipitated. This is described by the author as being bitter, soluble in alcohol, ether and chloroform, and obtainable in crystals by the spontaneous evaporation of its ethereal solution. It has the same color reactions as villosin, viz.: (1) Treated with concentrated H_2SO_4 + 2 drops HNO_3, a deep blood-red color appears, which fades in not less than 8 hours, but disappears entirely on the addition of water, with the formation of a precipitate. (2) Treated with concentrated H_2SO_4 and 2 drops H_2O, aided with a little heat, a blue color appears, similar to the one obtained by strychnine with $H_2SO_4 + K_2Cr_2O_7$.—Amer. Jour. Pharm., April 1890, 161–163.

Tiliacin—A Glucoside from Linden Leaves.—P. A. Latschinow found in linden (Tilia) leaves a glucoside, tiliacin, which can be split into glucose and *tiliaretin*. The latter is decomposed further into *anisic acid* and other bodies not further studied. The leaves of *Cirsium arvense* seem to contain also tiliacin, while the glucoside of *Phlox paniculata* differs as well from tiliacin as from hesperidin.—Amer. Jour. Pharm., June 1890, 296; from Chem. Ztg., 1890, 126.

Scutellarin—Isolation and Characters.—Takahashi has isolated scutellarin ($C_{10}H_8O_3$) from the root of *Scutellaria lanceolaria*, by treating the ether extract with caustic soda, acidulating the alkaline liquid and purifying the yellow precipitate. Scutellarin forms flat yellow needles, is inodorous and tasteless, melts at 199° C., is sparingly soluble in hot water, but dissolves in other simple solvents, in alkalies and without change also in sulphuric acid. Nitric acid dissolves it with a red color. It is not a glucoside, but appears to be a phenol. In 5 gm. doses given to a dog it produced no effect.—Amer. Jour. Pharm., April, 1890, 178; from Chem. Centr., 1889.

A Glucosidal Bitter Principle has been isolated by C. O. Myers and H. R. Gillispie, from *Scutellaria lateriflora*, and a

New Bitter Principle, probably an acid, from *Nepeta Cataria*, which see under *Labiatæ*, "Materia Medica."

Marrubiin—Deposition from the Fluid Extract.—Frederick G. Hertel found that the fluid extract of horehound made from 10 pounds of the herb, with diluted alcohol as menstruum, deposited nearly an ounce of marrubiin, while the fluid extract remained apparently as bitter. This quantity is considerably larger than the yield obtained by Harms and others, whose processes were evidently defective. Marrubiin crystallizes best from *cold* alcohol. See *Fluid Extract of Marrubiin*, under "Pharmacy."

Nepalin — Distinction from Aconitine.— According to F. Mandelin, nepalin, if evaporated down with a few drops of strong nitric acid, gives a residue smelling of musk. This residue, if treated with a few drops of a solution of potassa in absolute alcohol, gives an intense carmine or purple. Aconitine is quite indifferent in its behavior.—Zeitsch. Anal. Chem., 1889, No. 6, 760; from Phar. Ztschr. f. Russl., 23–41.

Ophioxylin—A Crystalline Principle from Ophioxylon serpentinum.—Wefers-Bettink isolated from the root of *Ophioxylon serpentinum*, used in East India as a purge and anthelmintic, by extraction with chloroform, a yellow crystalline principle, which he named ophioxylin. By means of crystallization from hot water and several times from alcohol it was obtained in needles melting at 72° C., and showing the composition $C_{16}H_{12}O_6$. It is difficultly soluble in water, but easily soluble in chloroform, benzol, carbon bisulphide and glacial acetic acid. The solution colors the skin first yellow and then brown. On careful heating ophioxylin sublimes. The yield is about 0.2 per cent. The principle somewhat resembles juglone. —Amer. Jour. Pharm., April 1890, 175; from Rec. trav. chim. de Pays-bas, viii., 319–322.

Santonin—Solubility in Castor Oil.—Reuter has made some experiments concerning the solubility of santonin in castor oil, with results which practically confirm a statement by Professor Flückiger, that if finely powdered santonin be heated with castor oil on a water-bath, even though vigorously shaken, it will not dissolve to the extent of more than 4 per cent., the greater part of which will crystallize out on cooling. Experiments with 1, 1.5, 2, 2.5, 3, 3.5 and 4 per cent. of santonin showed that it was soluble in castor oil in these proportions when heated on a water-bath, but that from the 1.5 to 4 per cent. solutions the santonin separated in handsome crystals on cooling. From the 1 per cent. solution prepared in small quantities there was only a very slight separation when reduced to a low temperature, but a solution prepared from 0.5 gram of santonin to 50 grams of oil remained perfectly clear and free from separation at a temperature of 15° C. during two days. A 0.5 per cent. solution remained absolutely clear at 15° C. during four days. The use of finely powdered santonin and the application of heat are essential, as santonin added to cold castor oil sinks to the bottom, whilst the viscosity of the cold oil hinders diffusion by shaking.—Pharm. Jour. and Trans., May 31, 1890, 978; from Apoth. Ztg., May 10, 1890, 246.

Methysticin—Properties.—Methysticin, the crystalline principle present in the root of *Macropiper Methysticum*, and prepared by extraction with boiling 80 per cent. alcohol, allowing to cool and repeatedly crystallizing the crystals obtained from 70 per cent. alcohol, has the following properties, according to Dr. C. Pomeranz: White silky prismatic needles, odorless and tasteless, melting at 137° C.; insoluble in cold water, slightly soluble in hot water, petroleum ether and ether, more soluble in cold alcohol, chloroform and benzol; the best solvent is boiling alcohol; it is not volatile, decomposing on heating with evolution of aromatic yellow vapors; with concentrated sulphuric acid it colors purplish-violet. Methysticin does not contain nitrogen, having the formula $C_{16}H_{14}O_5$, and is the methyl ether of methystic acid $C_{14}H_{12}O_5$; the statement is contradicted that by its oxidation benzoic acid is formed.—Pharm. Post, 1889, 910.

Moradin.—A neutral fluorescent crystalline substance from *Quina Morada*, which see under "Materia Medica."

Atropurpurin.—A new glucoside from the root-bark of *Euonymus atropurpureus*, which see under "Materia Medica."

Cantharidin—Acetone the best Solvent.—E. Dieterich finds acetone to be the best for this substance, requiring only 38 parts at 15° C. to dissolve 1 part cantharidin; of chloroform, 65 parts are necessary; of ether, 550 parts.—Amer. Jour. Pharm., June, 1890, 292; from Pharm. Centralh., 1890, 264.

COLORING MATTERS.

Chlorophyll—Nature of the Coloring Principles Composing It.—Hausen's studies and experiments lead him to conclude that chlorophyll is a mixture of two coloring principles which were in combinations with fats or similar substances. The preparation of the coloring principles is best accomplished from grasses, exhausted by boiling water and dried in the dark. The tincture from this dry material is green and in thin layers ruby red; it is concentrated, boiled with an excess of sodium hydrate for three hours, then treated with gaseous CO_2 and evaporated to dryness. Ether takes up the yellow principle and on evaporation leaves it in an impure state as a coral red mass. On extracting this with a mixture of ether and petroleum ether (1 : 1) and evaporating in the dark, the yellow coloring principle is obtained as orange-red needles or rhombic plates, free from nitrogen, insoluble in water, soluble in alcohol, ether, chloroform and benzol with dark yellow color, in carbon bisulphide with a brick-red color; it possesses great coloring power. Exposed to light it changes to a colorless substance giving the cholesterin reaction; with H_2SO_4 it gives a black-blue color. For obtaining the green coloring matter pure, the alkaline residue left by ether as above is purified by treatment for several days with ether-alcohol (1 : 1) and afterward absolute alcohol; the insoluble portion is dried, covered with ether-alcohol (10 : 1) to which phosphoric acid is added, the solution is dehydrated with $CaCl_2$, evaporated and the residue purified by redissolving in ether-alcohol (10 : 1). This pure chlorophyll forms a lustrous brittle mass, which is insoluble in water, benzol and carbon bisulphide, difficultly soluble in ether, easily in alcohol. It possesses the nature of an acid and contains nitrogen and iron; it dissolves in alkalies, also in acids forming with HCl a blue green, with H_2SO_4 a pure green solution. The solutions differ from the plant extracts in being less sensitive to exposure to light. The author has also found the

Yellow Coloring Principle of Flowers to be combined with fats, and was able to prepare some in crystalline form after saponification; by a spectroscopic examination the colors obtained were identical with the one from chlorophyll. *Carotin* also appears to be an identical substance.—Amer. Jour. Pharm., Nov., 1889, 561; from Pharm. Centralhalle, 1889, 540.

Litmus—Preparation of Pure Coloring Matter.—Otto Foerster recommends the following method for preparing the pure coloring matter of litmus: Commercial litmus of the best quality is first extracted in the cold with common alcohol, then digested with water, the solution filtered and evaporated. The residue of evaporation is again dissolved in water, filtered, and the filtrate precipitated with absolute alcohol containing a little glacial acetic acid. The precipitate is washed on a filter with alcohol, which removes a fluorescent coloring matter. The residue is again dissolved in water, and the solution treated as before, whereby a red coloring matter (violet in alkaline solution) is removed; and the last traces of this are removed by a repetition of this treatment. The precipitate is then moistened repeatedly with alcohol to remove traces of acetic acid, then dissolved in water, the solution filtered, precipitated with alcohol made faintly alkaline with ammonia, washed upon a filter with pure alcohol, and finally dried.

Litmus—Preparation of the Solution and Paper for Test Purposes.—D. B. Dott observes that there should be no such thing as a tincture of litmus, nor a *blue* litmus. He suggests the preparation of a solution for test purposes as follows: Macerate 1 part of litmus (previously pulverized) in 5 parts of water for two days; filter, and wash the residue with three parts of water. The solution so obtained is now heated to boiling, and dilute nitric acid gradually added until all the carbonate is decomposed and the solution acquires a permanent wine-red color. The liquor must be preserved in a bottle which has a slit cut in the cork or some other device to admit air, as litmus solution deteriorates both in color and odor in a closed vessel. When it is desired to prepare test papers from the solution, a strip of thin white filter-paper is dipped in the solution and dried. If the color is not exactly what is required, a drop of dilute acid or potash solution is added, as the case may be. Litmus paper so prepared has a purple tint, not the strong blue color frequently observed, which shows that the alkaline extract has been used in preparing the paper.—Pharm. Jour. and Trans., March 29, 1890, 797.

Litmus—Action of Acids.—According to J. E. Marsh, water must be present to obtain the common reaction for acids upon litmus. Dry blue litmus paper is not reddened in perfectly dry hydrochloric acid gas, concentrated or fuming sulphuric acid or glacial acetic acid. Only nitric acid is an exception, as nitration of the organic material takes place under liberation of water, thus giving rise to the color.—Chem. News, Jan. 3, 1890, 2.

Litmus—Decoloration in Closed Vessels due to Micro-Organisms.—R. Dubois finds that the decoloration of litmus in closed vessels, in the absence of air, is due to micro-organisms. The litmus retains its color in sterilized vessels.—Ztschr. Anal. Chem., 1889, No. 5, 613; from Bull. Soc. Chim. de Paris, *49*, 963.

Indigo—Valuation.—Honig has devised the following process for the valuation of indigo: From 0.5 to 0.8 gram of the finely-powdered sample is mixed with about 2.5 grams of finely-divided dry pumice-stone. The mixture is brought into a Zulkowsky–Wolfbauer extraction apparatus (a kind of Soxhlet), covered first with a layer of powdered pumice-stone, and then with cotton-wool. The extraction is performed with 50 c.c. of anhydrous aniline or nitro-benzol, and is generally completed in an hour. If thought necessary, the mass may be removed from the apparatus, washed with alcohol, dried, powdered, and extracted a second time. The solution is distilled off to recover the aniline, but it is impossible to carry the distillation to dryness on account of bumping. The contents of the retort are, therefore, emptied into a little graduated measure, when the volume must be carefully noted. About five times the volume of absolute alcohol is now added, the precipitated indigotin collected on a weighed filter, washed with alcohol until washings are almost colorless, dried at 110° C., and weighed. To the weight obtained must be added .013 gram for every 10 c.c. of aniline left, or .021 gram if nitro-benzol has been used. The author prefers using aniline. The indigotin must, of course, be tested for sandy matter.—Chem. and Drugg., Feb. 1, 1890, 154, from The Analyst.

ALBUMINOIDS.

Proteïds—Estimation with Special Reference to Milk.—I. Sebelien observes that milk contains three proteïds, caseïn, lactalbumin, and lactoglobulin. After giving the preliminary experiments made with the view of determining a method suitable for the estimation of the proteïds in milk, the author adopted the following:

(1) Total nitrogen first estimated in the colostrum. (2) Proteïd nitrogen estimated in the tannic acid precipitate. (3) Nitrogen in the precipitate produced by saturation with magnesium sulphate (caseïn + globulin). (4) Caseïn nitrogen estimated in the precipitate produced by adding acetic acid to milk. (Approximate) (5) Globulin nitrogen; two estimations; maximal, obtained by the difference of (3) and (4); minimal, estimated in the precipitate produced by magnesium sulphate after separating the caseïn by saturating with sodium chloride. (6) Albumin-nitrogen, estimated in the precipitate produced by adding tannic acid to the filtrate after the separation of the proteïds, precipitated by magnesium sulphate saturation. (7) Non-proteïd nitrogen is the difference between (1) and (2).

The method of estimating the total nitrogen in the precipitate produced by tannic acid, and multiplying this by 6.37 to obtain the total proteïds, is recommended as the most accurate method in quantitative investigations of proteïds, and is stated to produce less error than the more usual methods involving the washing, drying, weighing and incineration of proteïd precipitates.—Amer. Jour. Pharm., July, 1889, 363–365; from Zeit. physiol. Chem., through Jour. Chem. Soc.

Ricinin—An Albuminoid, not an Alkaloid.—According to the investigations of Hermann Stillmark, ricinin, the poisonous principle of castor oil seeds, is not, as has been claimed, an alkaloid, but is an albuminoid, one of the phytalbumoses, and belongs to the class of unorganized ferments. Boiling its solutions almost immediately destroys its activity, while heated dry it is not easily decomposed. It can be prepared from the seeds (after removing the integuments and the oil) by percolating with a 10 per cent. salt solution. The percolate is saturated with sodium and magnesium sulphates and allowed to stand in the cold, when besides the double salt there forms a white precipitate, easily separated from the crystals, which is filtered off and transferred to a dialyzer. In the dialysis the temperature must be kept sufficiently low to prevent decomposition. The slimy mass is scraped from the septum and dried in vacuo over sulphuric acid; after drying the masses are very easily pulverized and yield an odorless white powder, still retaining from 10–20 per cent. ash, which, however, does not interfere with its physiological action. The powder can be preserved for long periods; its best solvent is a 10 per cent. salt solution, which for experiments can be diluted without formation of an immediate precipitate. The varieties of Ricinus, Croton Tiglium and Jatropha Curcas, all appear to contain poisonous albuminoids which are similar, if not identical. Attention is called to the danger arising from the accumulation of castor oil press-cakes, which contain a substance more poisonous than arsenic (and for which no test is known) and which can so easily be obtained by any one; the suggestion is also made that the manufacturers of castor oil should be compelled to use the press-cakes as fuel as soon as they are taken out of the press, or else to mix with water and boil to destroy the activity of the poison.—Amer. Jour. Pharm., Dec. 1889, 610–611; from Pharm. Centralh., 1889, 650.

Albumen—Preparation in an Ash-free Condition.—Harnack describes the preparation of albumen which yielded no ash when burnt and presented some noteworthy characters. It was prepared by repeatedly dissolving and precipitating a metallic albuminate, obtained by treating a solution of a copper salt with a solution of albumen freed from globulin and otherwise as pure as possible. When all traces of phosphates had been removed, the albuminate of copper was decomposed and the albumen obtained free and otherwise unaltered. In this condition it was found not to be coagulated by boiling, and apparently incapable of passing into the coagulated state; it was not precipitable by alcohol, ether, carbolic acid or tannin; with pure, cold water it thickened and gradually assumed the appearance of a solution, especially upon heating to boiling temperature; from this solution it was precipitated by neutral salt solutions (again soluble on strong dilution) and by acids (insoluble in excess), but not by alkalies; and the albumen did not lose these properties on evaporation of the solution to dryness at 100° C.—Pharm. Jour. and Trans., Dec. 28, 1889, 503; from Ber. d. Deutsch. Chem. Ges., xxii., 3046.

Albumin—Potassium Sulphocyanide a Test for its Presence in Urine.—Zouchlos finds that a mixture of sulphocyanide of potassium in acetic acid is a more delicate test for albumen in urine than the corresponding potassium ferrocyanide test. It is prepared by mixing 10 c.c. of a 10 per cent. solution of potassium sulphocyanide with 2 c.c of acetic acid. A few drops of this liquid, which can be kept unaltered for a considerable time, added to an albuminous urine, produces a turbidity or a precipitate according to the quantity of albumen. The sulphocyanide can be used also with succinic acid, and can be carried dry, but must be carefully protected from moisture—possibly by enclosure in capsules—since the mixture is deliquescent.—Pharm. Jour. and Trans., June 28, 1890, 1059; from Pharm. Centralh., June 12, 1890, 353.

Albumen—Salicyl-sulphonic Acid a Test.—George Roch finds that if a solution of salicyl-sulphonic acid is added to an albumen solution a white precipitate insoluble in water is obtained; the filtrate tested with other albumen reagents fails to respond, showing the completeness of the precipitation. Direct experiments show that as little as 0.0005 gram albumen in 10 c.c. solution can be detected by a faint turbidity. To test its applicability in urine examinations, normal urine and solutions of uric acid, peptone and glucose were tried, but gave negative results. It is applied by taking 10 c.c. urine and adding 5 c.c. of a 20 per cent. solution of the salicyl-sulphonic acid, the albumen being indicated by an immediate precipitate or turbidity.—Amer. Jour. Pharm., Nov. 1889, 562; from Pharm. Centralhalle, 1889, 549.

Blood—Spectroscopic Demonstration in Urine and other Fluids.—C. H. Wolff accomplishes the spectroscopic demonstration of blood as follows: He puts 30 to 60 c.c. of the urine in question in a capacious test-tube with one-tenth its volume of a three per cent. solution of zinc acetate and heats it in the water-bath until the precipitate collects together and settles so far that the supernatant liquid can be decanted clear. The deposit is collected upon a small filter, washed, and covered with a few c.c. ammonia. The precipitate dissolves and the solution is let run into a test-tube 10 cm. in length and 12 m.m. in width, and made up to 4 to 5 c.c. by washing the filter. The filtrate is covered with a few c.c. of benzine, to exclude air, and mixed with 2 drops of a solution of ferrous sulphate containing tartaric acid (1 part each of tartaric acid and ferrous sulphate in 10 parts water), whereby the hæmatine is reduced and may be examined with the spectroscope. The characteristic absorption-band in the green—

$$a = \lambda\ 564—547,$$

can be seen even in the greatest dilution.—Chem. News, July 26, 1889, 50; from Pharm. Centralhalle.

Blood—Rapid Determination of Iron.—L. Lapicque recommends the following method for the rapid determination of iron in blood: Two gm. blood are heated with 3 c.c. pure sulphuric acid in a flask placed in a slanting position until the coagulum first formed is redissolved. It is then let cool and heated again after the addition of a few drops of pure nitric acid until a clear, slightly colored liquid is obtained, which no longer turns brown on heating. It is then diluted and boiled for a few minutes. When cold it is diluted to 40 c.c., and 10 c.c. of a 20 per cent. solution of ammonium sulphocyanide are added. The iron is then determined colorimetrically. —Chem. News, May 9, 1890, 229; from Soc. Biologique, through Ztschr. Anal. Chem., 1889, No. 6, 752.

Blood—Preservation.—Dr. Chas. Richet has recommended the following:

Gelatin	25 grams.
Water	75 "
Fresh blood	800 "

Dissolve the gelatin in the water at a gentle heat, and when the solution has cooled down to about 60° C. (140° F.), drop in the blood, drawn from the living animal through a sterilized canula. Mix well, and introduce the liquor into wide-mouthed phials, where it will soon become solid, and keep unaltered for a long time, like an ordinary fruit jelly, provided the surface be protected from mouldiness in the same way as common preserve; that is, by means of paper moistened with dilute alcohol.—Chem. and Drugg., Jan. 18, 1890, 72.

Milk—Effect of Sterilization.— A. Zimmerman states that during the process of sterilization, milk undergoes a physiological change, which is mainly noticed by the very fine emulsion-like coagulum it yields, facilitating the digestion, which takes place in about one-fifth the time required by ordinary milk. A few experiments conducted with the same specimens of pancreatin and bicarbonate of soda (10 grains of the former and 30 grains of the latter to 1 pint of the milk), between the temperatures of 95° and 110° F., indicated that the time for complete digestion varied from an hour to an hour and a half for the ordinary milk, and from 15 to 20 minutes for the sterilized. The peptone resulting in sterilized milk is not quite so bitter at first as that of the other milk, but upon standing several hours it acquires a similar taste. Condensed milk as served from the wagon diluted with three volumes of water, and milk which had been boiled, gave a coagulum similar to that of unboiled milk, and required about the same time as the latter for complete digestion. But condensed milk or boiled milk do not yield any fatty matter to ether before coagulation, while unboiled milk does to some extent, and sterilized milk almost completely, the ethereal layer being, however, difficult of separation on account of the swelling of the casein in the same.—Pharm. Rec., June 16, 1890, 244.

Cow's Milk—Dilution for Infant Feeding.—Geo. Smith having occasion to use diluted cow's milk for infant feeding in his own family, devised a formula which he bases upon the following analysis of human, ass's and cow's milk, published by Prof. Frankland in 1854:

	Woman.	Ass.	Cow.
Casein	2.7	1.7	4.2
Butter	3.5	1.3	3.8
Milk-sugar	5.0	4.5	3.8
Salts	.2	.5	.7

Taking Professor Frankland's figures for the average of fresh cow's milk, as quoted, it will be seen that when it is diluted with water in the proportion of three parts of the former to 2 parts of the latter, the average amount of constituents is modified as follows:

Fresh cow's milk 3 parts, water 2 parts—

Casein	2.52	per cent.
Fat	2.28	"
Sugar	2.28	"
Ash	.42	"

From these figures the author compiled the following formula.

The albuminoids, fat, and milk-sugar are by calculation made to approximate as nearly as possible to the average of these constituents in human milk.

Finely ground oatmeal	¼ gradually increasing to ½ oz.
Fresh butter	1 drachm.
Milk-sugar	2 drachms.
Fresh cow's milk	6 fluid ounces.
Pure water	4 fluid ounces.
Salt	5 grains, or a sufficiency.

Mix gradually the water with the oatmeal, milk-sugar, and salt, so that no lumps are formed in the mixture; then add the milk and butter, and heat to the boiling point in a clean, enamelled saucepan. The product should be made up to the measure of half a pint, if necessary, and given lukewarm with a spoon when required. He prefers the spoon-feeding to the bottle, on account of the ease with which the cleanliness of all the vessels may be secured. The oatmeal was introduced as a useful attenuant, and it has been found to act as a laxative, and also as a direct fat and heat-producer in the process of digestion.—Pharm. Jour. and Trans., July 6, 1889, 3.

Milk—Casein the Probable Cause of Acid Fermentation.—It has been well known for some time that the souring of milk is caused by bacteria, and one would expect that by this time the specific germ would be sufficiently well known. But it is not so. Hueppe and Marpmann, who have studied the subject minutely, are of opinion that there are more germs than one that possess the power of souring milk, and Grotenfeld has quite recently declared that the milk-souring germ is a modification of ordinary saprophytes, or that its properties are due to culture, and that there is no specific germ ferment causing the acid fermentation of milk. Dr. Fokker has spent some considerable time in experimenting on the subject, and his paper consists of a short description of these experiments, and a resumé of the conclusions he draws from them. He agrees with Grotenfeld, and thinks his own experiments justify him in maintaining that the rôle played by the germ in milk souring is a very subsidiary one, and that the fermentation is influenced by something besides the germ. This "something" is in all probability "casein," which acts in this respect like animal protoplasm; and if this is true, the place of casein might in its turn be taken by other substances. Coagulated albumen and the yolk of egg have a particularly powerful effect. The author is engaged in further researches on this subject.—Medical Chronicle, July 1889; from Fortschritte der Medicin.

Milk Analysis—Improved Coil for the Estimation of Solids.—Dr. Charles Rice observes that the advantage of employing the so-called Adams' coil in the estimation of milk solids, and particularly of milk fat, is generally recognized; there are some slight draw-backs, chiefly mechanical, which arise both from the material (blotting paper) the coil is usually made of, and its shape.

A good milk coil, or cartridge, should possess the following properties:

1. It should have a shape which permits the whole amount of the milk taken for analysis (say 5 to 10 gm.) to be applied, or poured upon it quickly, without risk of loss.

2. It should be so porous that it will readily permit the escape of water, during drying, for the estimation of solids, and afterwards readily admit the ether in the estimation of fat.

The material which the author has found to answer best for this purpose is the so-called "absorbent gauze," also known as "bleached hospital gauze," used for surgical dressings. It is a light open-mesh cotton fabric, having about 40 fine shreds to the linear inch, and weighing about 1¼ av. ounces per square yard.

The milk coils, or cartridges, which he has been in the habit of using, consist of a small roll of this gauze enclosed in a wrapper of blotting paper, and their mode of preparation is as follows:

Spread out a square yard of the gauze on a flat surface, fold it twice in one direction to reduce it to 36x9 inches, then fold it upon the long side in laps of 1¾ inches in width, so that when the whole is folded it will present a strip of 1 yard in length and about 1¾ to 1⅞ inches in width, and will consist of some 18 to 20 layers. Now begin to roll the strip up on the narrow end, like a bandage, but not too tight, until about 5 or 5½ inches of the gauze have been rolled up; cut the strip slantingly— that is, not perpendicular to its body, but under an angle, so as not to cause "bunching" when wrapped in paper. Place the roll upon a strip of thick blotting paper 4 inches long and 2¾ inches wide, and roll the latter over it so as to have it (the paper) project at one end about ¼ inch over the gauze coil and about ¾ inch at the other; then tie the coil with two threads. It will thus be 2¾ inches long and about ⅞ inch in diameter. The paper projection at one end forms a funnel—so to speak—about ¾ inch deep, which is capable of holding the full amount of milk to be used without danger of spilling. A coil of this kind—intended for the smallest size of Soxhlet's extractor—will easily take from 8 to 10 gm. of milk, and the latter will never entirely soak down to the bottom of the paper wrapper. If it should soak to the bottom of the gauze coil, this will do no harm, as it is ¼ inch above the end of the paper.

For the weighings, the author is in the habit of using very light glass weighing tubes, with snugly fitting covers, each being numbered both on the body and on the cap. A cartridge, perfectly dry, is first weighed in one of these tubes, and all subsequent weighings of it are made in the same tube. The milk to be examined is weighed in a separate stoppered graduated tube, then a suitable quantity of it, judged by guess and experience corresponding to, say, about 8 gm.—is poured into the compartment *a* of the coil, which had previously been taken from the weighing tube. The graduated tube is weighed again, and the difference corresponds to the milk taken for analysis. The coil at once absorbs the milk, and is then transferred on a capsule to the drying oven. When dry it is weighed for determination of solids, and the fat then determined by extraction with ether in the usual manner.—Amer. Drugg., March 1890, 41.

Milk—Volumetric Method of Estimating Fat.—G. E. Patrick has devised a method for the rapid estimation of fat in milk, which consists in bringing all the milk solids, excepting fat, into acid solution in a solvent which is without sensible action upon the fat, and then measuring the latter at a fixed temperature in a narrow calibrated tube. The solvent used is a mixture of strong acetic acid (80 per cent. or upwards in strength), oil of vitriol, and concentrated hydrochloric acid, in about the proportion of 9, 5 and 2 by volume. The HCl is added after the mixture of the other two is cooled. These proportions may be varied considerably without much impairing the efficiency of the solvent. The proportion of the solvent to the milk analyzed may also be varied considerably without affecting the final results. He takes usually 10.8 c.c. milk and 15 c.c. of the solvent. The operation is performed in a tube about 30 c.m. long, of about 17 m.m. calibre, excepting for a distance of 7 or 8 c.m. near the middle, where it is reduced to a thick-walled tube of about 5 m.m. calibre. The low part or body of the tube holds 21 to 22 c.c., and when charged the liquid fills the narrow portion and reaches about 2 c.m. above it. By means of a lateral perforation in the body of the tube, kept closed by a rubber band (a section of tubing), also perforated, the latter perforation being a little to one side of the former, using a pin as a lever, the liquid may be gradually withdrawn, and the fat made to enter the narrow part, which is graduated in divisions of 0.025 c.c. each. If 10.8 c.c. of milk are taken, one such division = 0.2 per cent. of fat, measured at 60° C., assuming average densities for both milk and fat. Of course any other scale and any other charge of milk may be employed, provided the tube be correctly proportioned. Before charging the tube there are placed in its lower part (best enclosed there when the tube is made) two pieces of pumice stone joined together by a bit of platinum wire—a very effective combination proposed by Dr. G. C. Caldwell to promote the regular boiling of liquids. In charging the tube the milk is first pipetted in, half or more of the required acid mixture is then added and well shaken with it, and the remainder then poured in—or a quantity sufficient to bring the liquid to the proper height in the tube. The charged tube is placed on a sand-bath, its contents heated to boiling, boiled quite briskly for ten minutes, then rather gently for ten minutes, or longer if necessary, in order to collect the fat in a layer at the top, and keep it gently agitated with an up-and-down motion until perfectly clear. A little practice is required to learn how best to manage the heat in this latter stage of boiling. When the fat layer is perfectly clear, the tube is immediately placed in water at 60° C. for ten minutes, and if great accuracy is not required the fat is at once lowered into the graduated tube, and its volume read at 60° after re-immersion in the water for a few moments. In the descent a little fat usually adheres to the tube, making the reading low by 0.05 to 0.2 per cent. Therefore, for exact results, the column of fat is only lowered until its top is just above that of the graduated tube; with a few drops of ether the adhering fat is washed down, the tube is replaced in hot water until the ether is *entirely* expelled, after which the fat is lowered and read at 60° C.—Chem. News, July 5, 1889, 5.

Milk—Detection and Determination of Sodium Hydrocarbonate—L. Padé observes that sodium hydrocarbonate is the salt most commonly added to milk to prevent coagulation. In more than a hundred experiments with pure milks, the author has found that a drop of decinormal sulphuric acid was always sufficient to render the ash of 10 c.c. of milk acid. It might seem, therefore, that by determining the alkalinity of the soluble ash of a milk we might determine the hydrocarbonate added. The author has, however, never reached this result, and according to his experiments in pure milk, mixed with 1 gm. per litre of sodium hydrocarbonate, we never find more than 0.34 to 0.40 gm. of alkalinity, calculated as sodium hydrocarbonate. This process, therefore, though sufficient for detecting the presence of the salt, has no value for its determination. He therefore incinerates 25 c.c. of the milk and determines the alkalinity with decinormal sulphuric acid; the volume obtained in c.c., multiplied by 0.0084 gm., gives the quantity of hydrocarbonate not transformed into sodium phosphate contained in 25 c.c. of milk, and on afterwards multiplying by 0.0336 we obtain the percentage. In this neutral solution, mixed with 2 c.c. of a slightly acetic solution of sodium acetate at 10 per cent., the phosphoric acid is determined by means of standard uranium acetate. The uranium solution is standardized so that 1 c.c. corresponds to 0.01 gm. of sodium hydrocarbonate in 100 c.c. of milk, when the determination is effected in 25 c.c.—Chem. News, Aug. 16, 1889; from Compt. rend., cix., 154.

Milk—Determination of Fatty Matter.—Lezé employs the following method for determining the fatty matter in milk. He takes a glass flask with a long neck graduated in c.c. and tenths of a c.c. He pours into it a mixture, already prepared and agitated, of 100 parts of the milk and 200 to 250 parts of pure strong hydrochloric acid, and heats until the liquid turns brown. He then adds dilute ammonia until the liquid becomes clear, and lastly hot water until the level reaches the height of the graduation. He then reads off the number of divisions occupied by the fatty matter. This butter has a specific gravity close upon 0.90, and by multiplying the volume observed by this factor we have the weight.—Chem. News, April 18, 1890, 191; from Compt. rend., March 24, 1890.

Digestive Ferments—Forms Directed in the National Formulary.—The "Pharm. Era," (July 1889) in a rather sarcastic vein calls attention to the popular demand for digestive ferments, which are steadily gaining in favor, as well as to the endeavor in the "National Formulary" to supply the demand by physicians and people with a variety of formulas respecting such ferments. "There are nine preparations of pepsin; four pancreatic articles; two additional forms of malt; kumyss, liquid rennet, and six unofficial preparations of beef. An undiluted pepsin is introduced, one hundred times the strength of the saccharated pepsin pharmacopœial. There is a compound powder of pepsin (containing diastase), aromatic pepsin, a simple elixir of pepsin, three compound elixirs of pepsin, a solution of the aromatic pepsin, a glycerite and a wine of pepsin. There is 'pancreatin,' a pancreatic compound powder, and a pancreatic solution. The assay for pepsin is newly given in full. Direction is placed for preparation of the pancreatin, with the added stipulation for strength that five grains should be able to peptonize one pint of milk under stated conditions. The liquor pancreaticus is made aromatic and to contain glycerin, while both this and the compound powder carry a large proportion of sodium bicarbonate, namely, three parts in the former preparation, and four parts in the latter, to one part of 'pancreatin.' The liquor seriparus is preserved with common salt and a little alcohol, and required to coagulate 200 to 300 times its quantity of milk under conditions stated. The lac fermentatum, or kumyss, is an effervescent preparation of the very simplest character, sufficient directions for making it being given in about three lines of print, following the order of three items of material. The elixir (simple) of pepsin is distinctly acidulous; the pepsin and bismuth elixir is likely to be just perceptibly alkaline; the iron and pepsin elixir is acidulous by presence of the citro-chloride of iron, the so-called tasteless chloride. All four of the pepsin elixirs contain compound elixir of taraxacum. Objections against combination of pepsin with bismuth salts and iron salts can be brought to conclusive trial, now that these definite combinations are before us. Whether or not a digestive agent and an antidigestive agent (operative as such) are combined in customary forms of administration, can be the better determined by having these carefully proposed forms of 'combination' clearly in type. The class of remedies in question is a good instance of the helpful regulating influence of the National Formulary. The American Pharmaceutical Association can do nothing better than to cherish this provisional addendum to the Pharmacopœia, and to hold the restless course of polypharmacy back upon ground somewhat safely settled by true investigation."

In a more serious vein, then, the editor calls attention to the scientific investigations that have been made in recent years in the direction of the application and utility of digestive ferments, the hindrances to their action, etc., and concludes that "*All these accumulated labors* are available for application in medical practice. The new physiology is going into use. It finds application in the giving of more confident directions to the patient. It asks for trustworthy preparations of digestive ferments, of peptonized nutrients, and of converted amyloids. It belongs to pharmacy to furnish these with such safeguards that each dispensing chemist can control their character and estimate their strength. It is an obligation upon the next Pharmacopœia to make introduction of such digestive agents as have an established value, and to give these the clearest possible defining tests."

Pure Pepsin—Preparation.—Joseph Schorp recommends the following process, an improvement on that of Scheffer, which secures a chemically pure pepsin, one part of which dissolves 3000 parts of coagulated egg albumen. Take fresh rennets (stomachs) of hogs, calves, sheep or cattle; clean with cold water; macerate from 50 to 60 hours in water well acidulated with hydrochloric acid and at a temperature not exceeding 50° F.; remove the rennets from the solution; strain the solution through cotton flannel; add common salt in the proportion of about 1½ pounds to the gallon of solution; mix well; allow to rest from 15 to 30 minutes; draw off the clear liquid and throw the scum formed upon cotton strainers and drain. Next dissolve the scum in the smallest quantity of water, acidulated with hydrochloric acid; filter; add two pints of alcohol (wood spirit answers well) to every pint of pepsin solution. When a precipitate has formed throw the whole upon white filtering paper, allow to drain, washing the precipitate repeatedly with diluted alcohol. Lastly dry the mass in a cool dry place, protected from dust and vapor. The dried mass thus obtained can easily be rubbed through a fine brass sieve, the result being a powder which is "pure pepsin." Pepsin made in this way is as constant as quinine, and will not deteriorate with age without a change in appearance.

Scaled Pepsin may be prepared of excellent quality as follows: Wash rennets (stomachs) well in cold water, chop them fine, macerate for five or six days in a strong solution of acetic acid, filter, evaporate at a temperature not exceeding 105° F. (or in vacuo) to a syrupy consistency, and spread upon glass to dry and obtain scales. The pepsin prepared in this way is, however, of no uniform active power.—Pharm. Rec., Sept. 2, 1889, 269; from Proc. Erie Co. Pharm. Assoc.

Pepsin (Artificial Gastric Juice)—Influence on Acetous and Lactic Fermentations.—F. O. Cohn records the results of experiments made respecting the influence of an artificial gastric juice on the acetous and lactic fermentations. The artificial gastric juice was made with the *Pepsinum germanicum* of Witte, of Rostock; the micro-organisms of the acetic and of the lactic fermentations were grown in suitable saline media. This was titrated with normal sodium hydroxide solution before and after infection with the micro-organisms in question. The influence on the rate of fermentation of (1) pepsin, (2) hydrochloric acid, (3) pepsin and hydrochloric acid, and (4) hydrochloric acid in the presence of peptone, was investigated; some experiments were also made to determine the amount of decomposition of phosphates brought about by hydrochloric acid. The results obtained were as follows:

(1) Pepsin does not hinder either the acetic or the lactic acid fermentations, but it appears to be a good nitrogenous pabulum for the organisms.

(2) Even traces of hydrochloric acid hinder the acetic fermentation. The lactic fermentation is stopped by just so much hydrochloric acid as is necessary to change the phosphates (which are present in the nutritive liquid for the proper growth of the *Bacterium acidi lactici)* into chlorides. The fermentation was thus probably hindered by the hydrogen phosphate thus liberated.

(3) Pepsin and hydrochloric acid together act in the same way as hydrochloric acid alone, only not quite so powerfully.

(4) Hydrochloric acid in the presence of (probably combined with) peptone, does not hinder the fermentations at all. It is also useless in aiding the digestion of albumin by pepsin.

(5) The acetic acid fermentation is hindered by hydrochloric acid when sufficient has been added to liberate from 0.5 to 0.7 parts per thousand of hydrogen phosphate from the phosphates present.—Amer. Jour. Pharm., March, 1890, 137–138; from Zeit. physiol. Chem., xiv., 75–105, through Jour. Chem. Soc., 1889, 1227.

Pepsin—Presence in Normal and Pathological Urine.—E. Stadelmann, in view of the frequent observation of the presence of a proteolytic ferment in urine, has made experiments to determine whether this ferment is pepsin or a ferment resembling it. As a result of his investigations, he finds that: (1) The ferment is true pepsin, as by its action all the products of peptic digestion are formed: protoalbumose, heteroalbumose, deuteroalbumose, and peptone. (2) If, however, the solution contain but little ferment, the only products of digestion are acid-albumin and small quantities of the primary (proto- and hetero-) albumoses; and, indeed, these products can be obtained by the action of 0.25 per cent. hydrochloric acid without any pepsin or raw fibrin; the same strength of acid has no action on boiled fibrin; but 1 per cent. hydrochloric acid acts energetically by itself on boiled fibrin, forming even deuteroalbumose and peptone.

The urine of various patients was investigated as follows: The urine was divided into three parts: (1) Was diluted with 0.25 per cent. hydrochloric acid in the proportion of 1 of urine to 3 of dilute acid. (2) Fresh, raw fibrin was added to extract the ferment, the fibrin was then washed and digested in 0.25 per cent. hydrochloric acid. (3) Was the control specimen; it was treated as in (1), but was also boiled, fibrin being then added to each. Trypsin was sought for, but never found. In fever patients, pepsin seems never absent from the urine; this includes typhoid fever, in which some have failed to find the ferment. Also in severe cases of stomach disease, including cancer, pepsin was often found. No diagnostic value can therefore be attached to the presence or absence of pepsin in the urine in cases of disease.—Amer. Jour. Pharm., July 1889, 365–366; from Zeit. Biol., through Jour. Chem. Soc.

Papain—Comparison with Pepsin as a Digestive Agent.—A. Ball records experiments made with commercial samples of papain and pepsin, from which it appears that the papains examined by him were very inferior to the pepsins in digestive power, while the peptone formed by them was deficient in diffusive properties. The B. P. test for pepsin, requiring that two grains should digest one hundred grains of coagulated albumen, is not rigid enough, since he finds that one grain of the best pepsins of the market will digest from five hundred to fifteen hundred grains when subjected to the prescribed test. Respecting pepsin, the author says that the best pepsins are prepared by extracting the ferment from the secreting membrane through maceration in glycerin, but the solution is extremely difficult to filter, scale and pulverize, and finally to obtain a pepsin free from albuminous matter. It is nevertheless desirable that a pure pepsin, free from starch, mucus and peptones, be supplied. A simple test for freedom from such admixtures is the non-stickiness of really pure pepsin when exposed to the atmosphere.—Yearbook of Pharm., 1889, 359–367.

Peptones—Examination of Commercial Products.—J. König and W. Kisch recommend the method of Kühne and Chittenden (see Proceedings 1887, 368) for estimating the soluble proteids in commercial peptones. The method consists in precipitation of the albuminoses with a saturated solution of ammonium sulphate, and in another portion the precipitation of both albuminose and peptone by sodium phosphotungstate, and estimation of the peptone from the difference. From 5 to 20 grams of substance (according to the proportion of water it contains) is taken. The insoluble matter and coagulable albumin are separated by filtration and by boiling, and their amount determined. This is preferably effected by Kjeldahl's nitrogen process. Multiplication of the nitrogen found by 6.25 gives the amount of albumin more correctly than direct weighing. The filtrate is made up to 500 c.c.; of this 50 c.c. or 100 c.c. is evaporated to about 10 c.c., and mixed with 100 c.c. of a saturated solution of ammonium sulphate in the cold. The precipitate is filtered off, washed with ammonium sulphate solution, dried and weighed, and the ammonium sulphate adhering is ascertained by a sulphuric acid determination and deducted. Of the same filtrate 50 c.c. or 100 c.c. is acidified with sulphuric acid, and precipitated with a strongly acid solution of sodium phosphotungstate. The precipitate is washed with dilute sulphuric acid, and the nitrogen it contains is determined. Although albuminose and peptone contain less nitrogen than albumin, the same multiplier should be used, as this will, to some extent, compensate for the traces of other nitrogenous substances precipitated at the same time.—Amer. Jour. Pharm., Oct. 1889, 525–526; from

Zeitschr. Anal. Chem., xxviii., 182–201; through Jour. Chem. Soc., Aug. 1889, 803.

Pancreatin—Functions and Valuation.—E. G. Eberhardt observes that our knowledge of pancreatin is very fragmentary, more so than in the case of pepsin, because of its greater complexity. Our methods of testing it are very crude and unsatisfactory. It is the office of the pancreatic juice to finish the work left uncompleted by the saliva and gastric juice, namely, to digest fats and the remainders of starchy and albuminous matter. We therefore find in it trypsin, a peptonizing ferment, amylopsin, a starch-converting ferment, and steapsin, an "emulsifying" ferment. These act only in alkaline solution, and the food pulp on entering the duodenum is rendered alkaline by the joint action of the bile and pancreatic secretion. The former undoubtedly plays also an important part in the digestion of fats. Steapsin has been differently stated to emulsify, saponify, and decompose fats. It is but rational to assume that fats must be in a soluble form before they can be assimilated. Solutions of pancreatin become more pronouncedly alkaline as they grow old. A mixture of pancreatin with a little sodium bicarb., moistened and kept warm, soon evolves carbon dioxide and volatile alkali. Is it not possible, then, that this "emulsifying" ferment is, after all, an alkali-forming ferment, producing, in conjunction with the bile, alkali wherewith to saponify and render soluble fats?

To properly value a pancreatin, then, requires a series of tests. Its proteolytic activity is determined by allowing it to act upon milk until nitric acid no longer produces a precipitate. The National Formulary requires 5 grains to peptonize 1 pint of milk in thirty minutes. Milk thus peptonized assumes a yellowish color, becomes more limpid, and develops a bitter taste. All of this the author has observed, but has never, even with the best sample under observation, been able to reach a point where the milk no longer precipitates with nitric acid. The end of the reaction seems to be reached when diluted nitric acid produces only a finely granular precipitate that does not separate as a curd.

The starch test is made by allowing it to act upon starch paste. The liquefaction is apparent to the eye, and the result can be checked by the reducing effect of the product upon alkaline copper solution. Iodine has been recommended as an indicator, but is not reliable, as it seems in some manner to be used up itself. If added to pancreatized starch paste in sufficient quantity, a blue color is produced that fades more or less rapidly, reappears on continued addition of iodine solution, fades again, and so on until a point is reached where the color seems to be permanent. The emulsifying test, made by agitating together definite volumes of pancreatic solution and some fixed oil, he considers utterly worthless, as it is made under conditions differing so radically from those existing in the body. He has not been able in this way to produce a permanent emulsion.

Of many samples tested, the majority were found wanting; and of five samples of which he has a record, one only was in a measure satisfactory, the others being deficient in one, two, or all directions. This may be partly because of the differing solubilities of the pancreatic enzymes, the alcoholic strength of the precipitating liquor thus determining the preponderance of one or the other of the ferments. Pancreatin also differs with the source, herbivorous animals yielding a product rich in amylopsin, carnivora one rich in trypsin, and omnivora would occupy an intermediate position. For this reason, pancreatin of the hog is preferred.—Amer. Drugg., Oct. 1889, 190; from Proc. Indiana Pharm. Assoc., 1889.

Diastase—Artificial Production.—According to A. Reychier, when freshly prepared wheat gluten is digested at 30–40 for a few hours with very dilute acids, considerable quantities of albuminoids are dissolved, forming an opalescent solution. The acids or acid salts employed were hydrochloric acid, hydrogen potassium sulphite, phosphoric acid, alkaline dihydrogen phosphates, acetic acid, formic acid, tartaric acid, and lactic acid. The product has all the reactions that, according to Lintner, are characteristic of diastase. The soluble albuminoids present in wheat flour also contain diastase, as can be proved by Lintner's reaction. Starch (4 grams) made into a paste with water was digested for two hours at 60–66°: (1) with an aqueous extract from 1.6 grams of wheat flour, and (2) with a similar extract to which 2 c.c. of hydrochloric acid ($\frac{1}{1000}$) had been added. At the end of this time the solutions still contained unchanged starch, and reduced 100 c.c. and 210 c.c. of Soxhlet's solution respectively, showing that a trace of acid increases the rapidity of fermentation. The diastase-like action of the soluble albuminoids in ungerminated barley can also be proved experimentally, and the author gives a table showing the reducing power of the solutions obtained when ungerminated barley (2 samples), maize, and malt, respectively, mixed either with water alone or with water and a trace of acetic or metaphosphoric acid, are kept at a suitable temperature. The author considers that it is not improbable that in the germination of barley and other seeds, the solubility and fermentative power of a portion of the albuminoids are produced by reactions similar to those which occur when gluten is dissolved in very dilute acids.—Amer. Jour. Pharm., Aug. 1889, 432–433; from Ber. d. D. Chem. Ges., xxii.

Beer Yeast—Chemical Properties of an Alcoholic Extract.—J. de Rey-Pailhade describes the chemical properties of an alcoholic extraction of beer yeast. On stirring up the yeast, previously washed and pressed, in an equal weight of alcohol at 86°, and filtering, he obtains a liquid of a light yellow color, clear, and having a slightly acid reaction. This liquid, which he names

Philothion, if shaken up with washed sulphur, or with ether saturated with sulphur, gives off sulphuretted hydrogen. One litre of the liquid recently prepared yields about 10 mgm. of H_2S. The alcoholic extract of yeast, if exposed to the air for a few days, loses this property of combining with or taking up sulphur.—Chem. News, May 30, 1890, 265; from Bull. Soc. Chim., Paris, 1890, No. 4.

Yeast—Glycerin as a Preservative.—A writer in "Ztschr. f. Spir. u. Presshefe-Industrie" recommends glycerin as a preservative of yeast. For liquid yeast, he directs to add one-eighth of its volume of glycerin. In the case of compressed yeast, the cakes are to be covered with glycerin and kept in closed vessels. Another method of preserving compressed yeast is to mix it intimately with animal charcoal to a dough, which is to be dried by exposure to sunlight. When it is to be used, it is treated with water, which will take up the ferment matter, while the charcoal will be deposited.—Amer. Drugg., Oct. 1889, 196.

Compressed Yeast—Manufacture and Detrimental Germ Impurities.—Alfred J. M. Lasché contributes a very interesting paper, in which he records investigations respecting the detrimental germ impurities that may occur in compressed yeast, and gives the following summary respecting its manufacture: The first step in the process is the

A. Preparation of the mash. 3,130 pounds of ground corn are mixed with 4,500 gallons of water. This mixture is heated to 190° F. (to swell the starch, and thereby facilitate its inversion), and subsequently cooled to 154° F., then 1,920 pounds of ground rye and 550 pounds of ground malt are added (malt is especially employed for the amount of diastase it contains, and is indispensable in the converting process). This mixture is then allowed to stand one hour, and is finally cooled to 80° F. The proportions of the different grains are, of course, largely a matter of opinion, and the various yeast manufacturers have different working formulæ.

B. When this mash has cooled to 80° F. it is drawn off into another tub, and one gallon of concentrated sulphuric acid is added, in order to dissolve all the remaining starch, dextrin, and glutinous matter, and to convert them into grape sugar. Finally a quantity of compressed yeast is added to start the fermentation. This yeast settles to the bottom of the tub, but as soon as fermentation has started (usually in half an hour) and carbonic acid is being generated, a current of the latter carries the yeast to the top of the liquid. It remains there, covered by a layer of the chaffy parts of the grain, until the yeast has accumulated in a sufficiently large quantity, and the current of carbonic acid has become strong enough, when it eventually breaks this film of chaffy particles and collects on the top of it in the form of foam. This goes on until all of the nutritive matter has been assimilated. The foam, containing all the yeast, rises about two feet above the top of the liquid, dependent on the size of the tub, and when no more effervescence is noticeable, fermentation is complete.

C. Immediately after fermentation has ceased, the foam is drawn off by means of troughs, and run, together with a fresh supply of water, into a revolving, six-sided and declining cylinder lined with a sufficiently fine strainer. During this step of the process almost all the chaffy remnants of the grain are separated, and the liquid, containing the yeast plant in suspension, is allowed to flow into a basin, whence, by means of a trough, it finally flows into a large tub.

D. The product in this tub is prevented from further fermentation by the addition of a sufficient quantity of ice. The yeast is now allowed to settle, the supernatant liquid drawn off, and the residue repeatedly washed to free it from all mechanical impurities.

E. When sufficiently cleansed it is run into a press by means of a steam pump. The press is constructed of a column of iron frames, either side of which frame being covered with a very fine straining cloth, and all the parts fitting tightly into each other. The yeast having been pumped into such a press, the water is separated from it by means of the strainer, and carried off through a waste pipe.

The yeast, now compressed, is taken out in the form of large cakes, and in this condition it is brought into commerce.

During the author's visits to various yeast manufactories, quantities of spoiled yeast were often met with, and the cause of this being unaccountable, the author undertook a series of experiments and investigations, which are recorded in the present paper very fully, and from which it appears that the cause of the change is due to the development of a peculiar bacillus—which has so far not been noted or designated, and which the author for the present designates as the *liquefying bacillus.* Occasionally. also, *Penicillium glaucum* and *Oidium lactis* were found, the latter, however, only rarely, and evidently an accidental impurity; the presence of *Penicillium glaucum* being apparently also an accidental impurity, though of more frequent occurrence, and avoidable by not allowing the compressed yeast to be exposed to the air for any length of time, and packing it more securely than is usually the case. The paper is accompanied by 38 cuts, showing the true yeast ferment—*Saccharomyces cerevisiæ*, as well as the *liquefying bacillus, Oidium lactis*, etc., under varying conditions.—Pharm. Rundschau, Jan. 1890, 13–22.

Bacteria—Dangerous Introduction into Medicines.—H. P. Campbell calls attention to a case of bacterial poisoning which resulted from the administration of a solution of quinine in whisky. The case is the more remarkable because both of these substances are classed among the antiferments, but the author explains the undoubted presence of bacteria in a slimy deposit which had formed in the solution to the unclean condition of the bottle in which it was dispensed. The author considers "dirty bottles" the most prolific source of infection that druggists have to deal with. When a prescription has been partly used by the patient, the sides of the bottle usually present the very conditions under which bacteria thrive best.

The glass is covered with a layer of damp organic matter, and if placed on the mantel, which seems to be the most convenient place for many people, is kept warm by the heat of the stove, thus adding the only thing needed to make it a veritable paradise for these organisms. Thus tenanted, the bottle is returned to have the prescription renewed, supplying them with fresh food for their growth. Some stores have already adopted a custom which disposes of this danger, and is worthy of more general adoption—that of giving a new bottle every time the prescription is renewed. While causing some extra work, it is certainly preferable to simply rinsing the bottle out, as enough spores are nearly always left to seed a new crop. The same is true of attempting to remedy stock solutions that have become infected, by simply filtering and washing out the bottles. The ordinary filter is absolutely useless, as the spores or seeds are so minute that they will pass through the interstices, and start a new growth in the solution. The primary fault in making these solutions is that the water used contains a few germs to start with, and if the substance dissolved is not antagonistic to their life they very rapidly increase. This is likewise true of distilled water as ordinarily collected, and it has been suggested that a better method would be to boil the water for half an hour, and then keep it protected from the air.

The following list comprises most of the substances in a pharmacist's stock that are liable to infection. In some, of course, the danger is small, but they are added for the sake of completeness. Water used in making solutions, including distilled; all aromatic waters, aqueous mixtures and chemical solutions (not antiseptic), including dilute acids; decoctions, infusions, vinegars, mucilages, and plant juices; syrups and confections; lard, oils and emulsions; elixirs and wines; fluid extracts and tinctures made from dilute or weaker alcohol; solid extracts, all damp drugs, and drugs from the animal kingdom like pepsin, ox gall, etc.—Amer. Jour. Pharm., March 1890, 113–118.

APPENDIX.

OIL OF ROSE, OTTO OF ROSE.*

BY D. L. HAIGH, PH. C.

Oil of Rose as found in the American market is a very variable article, both in quality and price. It comes to us, for the most part, through houses whose agents abroad procure it from different sources, at times direct from the manufacturers, and at others from parties who collect the oil from the small manufacturers. Then there are those who claim to be manufacturers of Oil of Rose who sell direct in this market. The greater proportion of Oil of Rose is distilled in the rose districts of the Balkans by small manufacturers who sell to the various houses who handle essential oils, and this variety of Rose Oil is known as Turkish Oil of Rose. There is some Oil of Rose manufactured in France, and in Germany one enterprising house has gone very extensively into this business, growing their own roses with success, and bid fair to become formidable rivals of the Balkan product. At present, however, neither the French nor German article comes to the American market in any quantities, the yield of the German crop being only about 4½ kilos this present year. It has been claimed that the Turkish oil is far superior in odor to that of oil grown elsewhere, owing, it is stated, to the special favorable influence of climate upon the roses grown in the Balkans; but from results obtained, the German growers claim to have disproved this assertion, quantity being their only drawback, the supply of roses not being large enough to manufacture any large amount of oil as yet. The French oil is too expensive for general use. The roses grown in both France and Germany produce an oil that contains a much higher percentage of stearopten than oil obtained from the Turkish roses —the stearopten in the French and German oils ranging from 30–60 per cent., in the Turkish oils from 5–20 per cent. It is claimed that the colder climate of France and Germany has this influence upon the roses, but it may be largely due to different methods of cultivation and further to the fact that different varieties of roses are grown in these countries. It is said that the yield of oil from the white rose leaves or petals is much larger and contains a much higher percentage of stearopten than that from the red rose petals. If this is true it accounts to some extent for the high percentage of stearopten of the French oil, as the white rose is the one mostly grown in France, being more suitable to that climate.

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* Read at the special session of the Section on Scientific Papers, the discussion being printed on page 173. The paper was received for publication December 20.—PERMANENT SECRETARY.

This feature of the quality of the White Rose is made use of in Turkey to produce inferior grades of oil and at times for purposes of adulteration, a large proportion of White Rose leaves being distilled with the red. One of the large oil houses of Germany now furnishes an oil freed from stearopten at an advance in price of about 20 per cent. When we take into consideration the source of Oil of Rose, the many small distillers who produce it, the variation produced by different crops of roses, its great value and the attending inducements to adulterate it, it is little to be wondered at that the oil varies in quality. In fact it is difficult to figure how Oil of Rose can be sold at the present prices, when it is estimated that from 120 to 150 pounds of rose leaves are required to produce one ounce of oil. The figure given by the German manufacturers is 145 pounds to one ounce. It may be that the rose leaves are very cheap, labor cheap, and the by-products to help out, enable this to be done.

That Oil of Rose is generally adulterated is well known, and it is claimed by many who are in a position to know that the oil is especially manipulated for the American market. It is believed that this is done by the manufacturers, and it is not probable that the oil is tampered with afterwards, and certainly not if procured from reputable houses. If it is true that the Oil of Rose we buy has been manipulated, as seems the case, we probably would not recognize the pure oil if we should see it, and it may be the manipulated oil is the best. But so little is known of this oil, its great value preventing extended experiments, and without any known standard to be guided by, it is not possible to say whether any oil is pure or adulterated. The German chemists have done the most work on this subject, and if they have been successful in obtaining what was *known* to be pure oil, and the tests based on the action of this oil are to be relied on, then the oils that I have obtained make a very poor showing.

It is not possible to prove or disprove the tests as given by various authorities, nor to originate new tests without having a sample of what is known to be *pure oil.* Several samples were procured which were guaranteed to be pure oil, but pure in these instances meant probably as pure as any commercial Oil of Rose. Many substances, it is claimed, are used as adulterants of Oil of Rose, among which are Geranium, Bois de Rose Rosé, Santal, Rhodium, Bois de Rose Femelle, Gingergrass, Copaiba, Paraffin, Spermaceti, etc. The last two articles are probably not used, as their identification is too easy. It is more likely that stearopten is added in excess —as this is a natural constituent in the oil, it cannot be told whether it has been added or is the natural product. Oil of Geranium, Bois de Rose Rosé and Santal are now supposed to be the chief adulterants of Oil of Rose.

Gingergrass is imported into Turkey in large quantities for the purpose of adulterating Oil of Rose, although it is said the Turkish government has laws prohibiting its importation. The oil gingergrass is said to be very disagreeable at first, but by exposing to the sunlight and other treatment it acquires a pleasant odor. I have applied the following tests as given by different authorities to nine samples of Oil of Rose, also a sample of Bois de Rose Rosé, Bois de Rose Femelle, Rhodium and Geranium, and in case of some of the tests to Oil of Santal and Gingergrass. The results are here given :

No.	Appearance.	Spec. Grav.	Congealing point.	Cost.
I.	Straw color.	.862 at 25° C.	18° C.	$4 65
II.	Light straw color, not so dark as I.	.862 “	17° C.	4 50
III.	Reddish color, due to sediment.	.868 “	Gets thicker at 19° C., but still remains liquid at 0° C.	3 50
IV.	Very light color.	.868 “	16° C.	4 35
V.	Straw color.	.879 “	Congeals at 4° C. to a thick fluid, shining plate-like crystals settling at 10° C.; remains liquid and clear.	13 50
VI.	Somewhat darker than V.	.878 “	Becomes cloudy at 0°C., but not solid: no shining, plate-like crystals as in V.	5 50
VII.	Pale straw color, lighter than V.	.863 “	16°–17° C.	4 65
VIII.	“ “ “ “	.863 “	16°–17° C.	4 65
IX.	“ “ “ “	.864 “	16°–17° C.	4 65
X.	Bois de Rose Femelle, almost white.	.873 “	Does not congeal at 0° C.	
XI.	Bois de Rose Rosé, “ “	.869 “	“ “ “	
XII.	Rhodium, yellow.	.917 “	“ “ “	
XIII.	Geranium dark straw color.		“ “ “	

It is noticeable the difference in color in the oils on congealing. Nos. IV., VII., VIII., IX., are light-colored oils, and become whitish, something like crushed ice in appearance. Nos. I. and II. become of darker straw color.

Odor Test.

A few drops of the oils were placed on blotting paper and allowed to evaporate, the odors being noted from time to time, also note made of the length of time the odors remained on the papers. This test is better carried out by diluting the oil with cologne spirits and then placing the dilute solution on blotting paper, the undiluted oil being too concentrated to admit of other odors being detected.

In permanence of odor Nos. V., VII., VI., II., IX., VIII., I., IV., III., rank in superiority as named.

The odor of geranium is quite pronounced in all of the samples, except VII. and IX. In V., which is the most expensive oil, geranium is very prominent.

Odor Test with Hot Water.

Boil 5 c.c. water in a test tube and pour upon it a few drops of the oil to be tested, and shake well. In this way it is supposed the odors of any foreign oils can be detected. In the case of the oils tested in this way, there is a sharp acrid odor, strongly resembling geranium, irritating to the throat and producing coughing. This odor is peculiar to all the samples tested. Oil of geranium produces the same effect. Bois de Rose Femelle and Bois de Rose Rosé act in the same manner, but without the geranium odor. Rhodium develops an extremely harsh and irritating odor. Even in the cases of VII. and IX. the geranium odor was pronounced.

Test by Evaporation.

A few drops of the oil are placed on a watch-glass and allowed to evaporate at a gentle heat on the steam-bath, and the odor noted from time to time. Any form of heat seems to develop the geranium odor in the samples of oil of rose at my disposal. Within two hours after placing I., II., III., and IV. on the steam-bath, there remained a liquid that possessed little of the odor of rose ; V., VI., VII. and VIII. evaporated without leaving this liquid. Bois de Rose Femelle and Bois de Rose Rosé evaporate much more rapidly than the rose oils. Rhodium was less volatile than either, and left a gummy residue. Geranium has about the same volatility as the rose oils. During the first half hour of evaporation, if the oil is watched closely, the different odors can be distinctly discerned, and this test would be a valuable one in the presence of a known standard.

Hager's Test.

In a clean dry flask place 5 drops of oil and 25 drops concentrated sulphuric acid, agitate, set aside, and when cool add about 10 c.c. of 90 per cent. alcohol and shake. If the oil is pure an almost clear solution will result, which upon boiling and cooling, will remain a clear yellowish brown liquid. If Geranium or Pelargonium be present, the mixture will be cloudy, and upon standing, deposit a sediment. If heated to the boiling point, the sediment will dissolve to some extent, but the mixture will not become clear, and in cooling will become very cloudy.

I. Gives fairly clear solution, becomes pink on heating, but when cooled is very cloudy, and deposits a sediment. An intensely disagreeable odor is developed. The pink color disappears in a few hours, and a muddy yellowish-white mixture remains.

II., III. and IV. act in the same manner as No. I., except that there is not the intensely disagreeable odor developed in No. IV. as in I. II. and III.

V. Gives a clear liquid, pink in color, with resinous sediment, which does not dissolve on boiling, and does not render the liquid turbid. No disagreeable odor.

VI. Gives clear liquid, nearly colorless, and with very little sediment. No disagreeable odor.

VII. Clear liquid, nearly colorless, no sediment or disagreeable odor. On cooling the liquid becomes cloudy.

VIII. Clear liquid, pink color, no sediment or disagreeable odor; on cooling becomes cloudy.

IX. Clear liquid, nearly colorless, no sediment or disagreeable odor; on cooling becomes cloudy.

X. (Bois de Rose Femelle). Muddy liquid, pink color (color disappears within an hour). A thick resinous sediment; intensely disagreeable odor.

XI. (Bois de Rose Rosé). Acts like Bois de Rose Femelle.

XII. (Rhodium). Muddy liquid, deep pink color, which does not disappear on standing. Liquid remains cloudy even when boiled. Odor intensely disagreeable.

XIII (Geranium). Pink cloudy liquid, which remains cloudy even when boiled. The Geranium odor is still predominant; in cooling the pink color disappears.

It may be stated that the sediment of resinous matter in applying Hager's test to the Oils of Bois de Rose Femelle, Bois de Rose Rosé and Rhodium, is much greater than in any of the samples of Oil of Rose.

Sulphuric Acid Test.

Equal drops of oil and concentrated sulphuric acid stirred together with a glass rod on a watch-glass, the pure oil will retain its original odor, while other oils will give off very unpleasant odors, even if mixed with pure oils.

I. Dark brownish red color, turning almost to black. Mixture becomes thick on standing, a reddish brown liquid separating out from the resinous portion. Disagreeable odor developed.

II. Same as I. except the liquid separating out from the resinous mass is reddish purple.

III. Same as No. I.

IV. Same as II. with purple color in liquid more pronounced.

V. Disagreeable odor. On standing the mixture forms a black resinous ring with yellow liquid.

VI. Same as V. with much lighter colored liquid.

VII. No disagreeable odor, otherwise same as VI.

VIII. Disagreeable odor. Nearly colorless liquid separates from the black resinous matter.

IX. Very little disagreeable odor, otherwise same as VII.

X (Bois de Rose Femelle). Disagreeable odor, colorless liquid above resinous matter.

XI (Bois de Rose Rosé). Disagreeable odor, brownish black liquid above resinous matter.

XII (Rhodium). Disagreeable odor, deep red liquid above the resinous matter.

XIII (Geranium). Odor of geranium not destroyed. Light pink colored liquid above the resinous matter.

Oils of Gingergrass and Santal when subjected to the sulphuric acid test retain their odor fairly well; gingergrass solidifies, no liquid separates from the resinous matter. Santal gives residue and liquid similar to geranium.

The black resinous matter produced by sulphuric acid on oil rose, is in fact not black but beautiful purple with pinkish tinge, the black color being due to concentration. The purple color is better seen on adding a small portion of water and stirring. Dilute sulphuric acid seems to bring out the color. The resin is insoluble in alcohol, but is soluble in ether, but both these substances destroy the purple color.

Bromine Test.

A few drops of oil is placed in a test tube and bromine added one drop at a time. If the oil is pure an apple green color results. If gingergrass is present it discolors the bromine. If liquor potassæ is subsequently added, the pure oil gives a viscous green colored precipitate in clots and the odor remains unaltered. With gingergrass present, a yellow milky precipitate, a reddish liquid and an intensely disagreeable odor is the result.

I. Light green color; no bromine is decolorized before producing the green color. Addition liquor potassæ produces light green precipitate, which floats on top the liquid. The odor of bromine so interferes that it is hardly possible to note whether the odor of the oil is affected or not.

II. Darker green color than I. Liquor potassæ produces a dark yellow precipitate which floats on top the liquid.

III. Yellowish green color, several drops of bromine being decolorized before producing this color; liquor potassæ gives a light yellow precipitate, lighter than sample I.

IV. Green color, after decolorizing several drops of bromine. Liquor potassæ brownish yellow precipitate like II.

V. Bromine not discolored, deep green color produced. Liquor potassæ does not affect the green-colored liquid which settles to the bottom; the alkali solution remains almost colorless.

VI. Does not discolor bromine, but forms a yellowish green color, and on addition potassa solution turns yellow. On standing, a greenish yellow sediment settles out from the murky yellow potash solution.

VII. Does not decolorize bromine, but forms deep green color with it, and when solution potash is added forms yellowish mixture. On standing, a yellowish brown sediment settles out from a slightly greenish yellow liquid.

VIII. Does not decolorize bromine, but forms a green solution which on addition of solution potassa forms a yellow mixture which on standing settles out a brownish yellow sediment.

IX. Same reactions as VII., except that the precipitate, after addition of alkali and allowing to stand, is lighter in color than VII.

X. (Bois de Rose Femelle) Decolorizes bromine with formation of a gummy precipitate, and the odor is very disagreeable.

XI. (Bois de Rose Rosé) Decolorizes bromine and forms with it a precipitate that has an oily appearance. Odor is very disagreeable.

XII. (Rhodium.) Bright purple color at first, changing in a few minutes to deep green. On addition of alkali a dark brownish-black precipitate forms and floats on top of the liquid. Odor very disagreeable.

XIII. (Geranium.) Does not decolorize bromine, but forms with it a deep green colored liquid. On addition of the alkali solution, a green precipitate is formed, which floats on top of the liquid. On addition of excess of alkali the precipitate becomes dark yellow.

In case of the oils rose it is hardly possible to tell to what extent, if any, the odor of the oil is affected by bromine, as the fumes of the bromine interfere. With Bois de Rose Rosé, Bois de Rose Femelle and Rhodium the disagreeable odor can be detected.

Iodine Test.

Place one gram of iodine under a bell-jar with a few drops of oil, both in separate dishes. If the oil is adulterated it becomes brown to black within 3 to 4 hours.

I. Brown rim about the edge of the oil. The body of the oil not affected.

II. Greenish color on edge of dish and brown spots on the edge of the oil.

III. Dark resinous spots on border of oil.

IV. Same as III.

Nos. V., VI., VII., VIII., and IX. have brown rims formed about the edges of the oils, but otherwise are not affected.

X. (Bois de Rose Femelle.) Not affected.

XI. (Bois de Rose Rosé.) Not affected.

XII. (Rhodium.) Green or bluish-green border, and the fumes of the oil diffuse over the entire inner surface of the bell-jar, forming a green, gummy coating.

All of the rose oils become dark brown even to black within 12 hours, in presence of iodine.

Test with Ether and Sulphuric Acid.

Take 6–8 drops oil, place into a flask with 3 c.c. ether; a clear, colorless liquid should result. If now .75–1.25 c.c. concentrated sulphuric acid is added, it will cause boiling; after shaking and setting aside, two layers will form, the upper ether layer colorless, and the lower acid layer yellowish, not brown or dark yellow in color. If the acid layer is dark, it shows the presence of pelargonium or geranium. A dark colored ether layer shows an unknown adulteration. Yellow ether layer shows presence of geranium.

I. Clear solution with ether; acid layer dark transparent red; ether layer yellow.

II. Clear solution with ether; acid layer very dark red; ether layer brownish-yellow.

III. Clear solution with ether; acid layer black; ether layer brownish-black.

IV. Clear solution with ether; acid layer deep black; ether layer dark brown.

V. Clear solution with ether; acid and ether layers are so black that the point of contact cannot be discerned. Upon adding an excess of ether, a small ether layer appears at the top colored nearly black.

Nos. VI., VII., VIII., and IX., act in similar manner to V. In case of IX. the solution is not so black as with the others.

X. (Bois de Rose Femelle.) Clear solution with ether; acid layer, deep black; ether layer, dark-brown.

XI. (Bois de Rose Rosé.) Same as X.

XII. (Rhodium.) Clear solution with ether; acid layer, deep red; ether layer deep red.

XIII. (Geranium.) Clear solution with ether; acid layer, dark brown; ether layer, yellow.

Nitric Acid.

The effect of this acid upon Oil Rose is interesting. A few drops of the oil are placed in a test tube and a few drops nitric acid added.

The 9 samples of Oil Rose act very much alike, at first becoming reddish purple and in a few minutes a violent reaction takes place, with evolution of nitric fumes and formation of a body similar to elaidene. This same action takes place with Bois de Rose Femelle, Bois de Rose Rosé and Geranium. With Rhodium the violent reaction does not take place for nearly half an hour.

The result of these tests may be summed up thus:

Without a sample of pure oil for a standard it is impossible to place reliance on any of the tests but that of odor.

The odor of the oil and percentage of stearopten are the factors to be considered, and the oil selected in accordance with what is deemed best for the purposes for which it is intended.

In the present state of the market this is the best that can be done.

EMLEN PAINTER, Ph. G.

Born at Concord, Pa., September 8, 1844.

GRADUATE IN PHARMACY,

Philadelphia College of Pharmacy, 1866.

PROFESSOR OF PHARMACY,

California College of Pharmacy, 1876–1883.

TRUSTEE COLLEGE OF PHARMACY

of the City of New York.

1885 to 1888, 1889.

AMERICAN PHARMACEUTICAL ASSOCIATION.

Member, 1870–1890.

Vice-President, 1877 and 1881.

President, 1890.

Died in New York City, January 15, 1890.

MEMORIAL OF EMLEN PAINTER.

The Committee appointed to prepare resolutions on the decease of the late President, Emlen Painter, report as follows:

The hand of Providence has removed from this Association its honored President, Emlen Painter. He became a member of the American Pharmaceutical Association in 1870, and during his residence in California attended on two occasions the meetings of this organization. He removed to New York in 1884, and in that year and at all subsequent meetings during his life, he was present and took an active part in our business and deliberations. He contributed numerous valuable papers and reports to our Proceedings. He was enthusiastic in the welfare of this Association, and had the highest interests of our profession and the fraternity always in view.

He served this Association as its Vice-President in 1877, and again in 1881; he was an earnest laborer on its Formulary Committee in 1886–87, and was tireless in his endeavors to make the meeting in San Francisco in 1889 a success, and in many other ways manifested his high regard for his associates. In 1889 he was elected President of this Association, and looked forward to an active and useful term of office.

For a few years his health had been failing, but his determination and energy seemed to restrain the progress of his complaint. After his return from the Pacific coast, disease made rapid progress, and on January 15, 1890, he passed away and was at rest.

In the history of this Association it is the first time it has been necessary to record the decease of a President in office, and this tribute to his worth is cheerfully tendered as expressive of our sorrow and regret.

His was a noble character; honesty and integrity were leading traits in his personality. When convinced of a duty, that duty was his care until it was completed. Courage and manliness were prominent in all his dealings with the world and his associates. In his family there were close ties of affection to wife and children. In business, an earnest attempt to apply his best skill and knowledge for the benefit of others was always manifested. In our Association he was an earnest and conscientious member, who regarded it a duty to contribute of his knowledge for the good of the fraternity.

We mourn his early departure and the loss that this Association sustains. We recommend that a suitable space in our printed and written volumes for the current year be dedicated to his memory, and that a copy of this Memorial be forwarded to the widow of our deceased friend.

P. W. BEDFORD,
JOSEPH P. REMINGTON,
W. J. M. GORDON,
M. W. ALEXANDER,
ALBERT E. EBERT,
} *Committee.*

LIST OF LIFE MEMBERS.

(Names of life members under old constitution in *Italics*, under present by-laws in SMALL CAPITALS.)

Ash, Matthew F.
Babo, Leopold.
Baxley, J. Brown.
Berrian, George W.
BIROTH, HENRY.
Blatchford, Eben.
Bower, Henry.
Bullock, Charles.
Burnett, Joseph.
CANNING, HENRY.
Chamberlain, Guilford T.
Colcord, Samuel M.
Cummings, Henry T.
CUTLER, EDWARD WALDO.
Dearborn, George L.
Doliber, Thomas.
DRURY, LINUS D.
Du Puy, Eugene.
EBERT, ALBERT E.
Ellis, Evan T.
FOUGERA, EDMOND C. H.
Fox, Daniel S.
FULLER, OLIVER F.
Gale, Edwin O.
Gale, William H.
Gallagher, Charles K.
Goodwin, Wm. W.
Gordon, Wm. J. M.
Grahame, Israel J.
Hale, Frederick.
Haviland, Henry.
Hay, Henry H.
HEINITSH, CHARLES A.
Heintzelman, Joseph A.
Heyl, James B.
HOLZHAUER, CHARLES.
Hudnut, Alexander.
JACQUES, GEORGE W.
Jenks, Wm. J.
JONES, EDWARD C.
JUDGE, JOHN F.
Kent, Robert R.
KESSLER, EDWARD F.
Kidder, Samuel.
KING, JAMES T.
KLUSSMANN, HERMANN.
LAND, ROBERT H.
Leitch, Arthur.
LEMBERGER, JOSEPH L.
MAISCH, JOHN M.
McConville, Thomas A.
McPherson, George.
Mellor, Alfred.
Melvin, James S.
Metcalf, Theodore.
MILBURN, JOHN A.
MILHAU, EDWARD L.
Moffit, Thomas S.
Moith, Augustus T.
Molwitz, Ernest.
Newman, George A.
Niebrugge, John A.
Ollif, James H.
Paine, James D.
Parr, John C.
Patten, I. Bartlett.
Peabody, William H.
Perkins, Elisha H.
Perot, T. Morris.
PFINGST, FERDINAND J.
Rano, Charles O.
REMINGTON, JOSEPH P.
Rittenhouse, Henry N.
ROBINSON, JAMES S.
Rollins, John F.
Russell, Eugene J.
SANDER, ENNO.
SEABURY, GEORGE J.
Sharp, Alpheus P.
SHEPPARD, SAMUEL A. D.
Snyder, Ambrose C.
Steele, Henry.
Sweeny, Robert O.
Taylor, Alfred B.

Thompson, William B.
Tufts, Charles A.
Turner, T. Larkin.
Vernor, James.
Wardell, Robert C.
Warner, Wm. R.
Wheeler, Lucien F.
White, Aaron S.
Whitfield, Thomas.
Wiegand, Thos. S.
Winkelmann, John H.
Woltersdorf, Louis.
Woodbridge, George W.
Zeilin, J. Henry.

ALPHABETICAL LIST OF THE NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED FOR ANNUAL DUES OR CERTIFICATES FROM JULY 1, 1889, TO JULY 1, 1890.

	Annual Dues.	Certificates.
Abernethy, Maxwell '89–'90	$10 00	
Acker, Philip '89	5 00	
Ahlbrandt, Henry E '90	5 00	
Albro, Willis H '89	5 00	
Alexander, Maurice W '90	5 00	
Alfreds, Henry J '88	5 00	
Allen, Albert W '89	5 00	
Allen, E. Floyd '89	5 00	
Allen, William H '88	5 00	
Aman, Henry '89	5 00	
Anderson, Jesse N '89	5 00	$7 50
Anderson, Samuel '90	5 00	
Andriessen, Hugo '89–'90	10 00	
Angney, John R '89	5 00	
Armstrong, Andrew M '89	5 00	
Aspinall, Walter A. '90	5 00	
Atwood, Herman W '89–'90	10 00	
Aubley, Samuel '89	5 00	
Ault, Charles H '89	5 00	
Averill, William H. '89–'90	10 00	
Bacon, Gaston E. '89	5 00	
Baier, Charles G. '89	5 00	
Bailey, Frederick '90	5 00	
Bain, Andrew W. '89	5 00	
Baker, Edwin '89–'90	10 00	
Baker, T. Roberts '90	5 00	
Baker, Walter T '89	5 00	
Ball, Charles E '90	5 00	
Ballard, John W '90	5 00	
Balluf, Paul '89	5 00	
Balser, Gustavus '89	5 00	
Baltzley, Zacharias T '89	5 00	
Bartells, George C '89	5 00	
Bartlett, N. Gray '89	5 00	
Bartlet, William W '88–'89	10 00	
Bauer, Louis G '89	5 00	
Bayliss, Lewis F '90	5 00	
Bayly, Charles A '89	5 00	
Beach, Clifton H. '89	5 00	
Bechmann, Charles R '90	5 00	
Beckett, Frederick A '89	5 00	
Beckmann, Oscar A '89	5 00	
Bedford, P. W '89	5 00	
Beetem, Jacob S '89	5 00	
Behrens, Paul J '89	5 00	
Beitenman, William W. '90	5 00	
Belt, Z. James '90	5 00	
Bendiner, Samuel J. '89–'90	10 00	
Benjamin, James H '90	5 00	
Best, John. '90	5 00	
Betz, Otto E. '89	5 00	
Betzler, Jacob '89	5 00	
Beyschlag, Charles. '90	5 00	
Biddle, Herbert G '89	5 00	
Billings, Henry M '89–'90	10 00	
Bingham, Charles C '89–'90	10 00	
Bissell, Emery G. '90	5 00	
Amount carried forward	$330 00	$7 50
Amount brought forward	$330 00	$7 50
Bissell, John G '90	5 00	
Blaikie, William '89	5 00	
Blair, Henry C '89	5 00	
Blake, James E '90	5 00	
Blestren, Hans M. G. '89	5 00	5 00
Bley, Alphonso A. W. '89–'90	10 00	5 00
Blocki, William F '90	5 00	
Blumauer, Louis '89	5 00	7 50
Bocking, Edmund '89	5 00	
Bodemann, Wilhelm '89	5 00	
Boehm, Solomon '89–'90	10 00	
Boerner, Emil L. '89	5 00	
Boggs, Edwin L '90	5 00	
Bolles, William P '89	5 00	
Bond, John P '89	5 00	
Bondurant, Charles S '89	5 00	
Borell, Henry A '90	5 00	
Boring, Edwin M '89	5 00	
Bossidy, Bartholomew '89	5 00	
Bostick, Elmer E '90	5 00	
Bower, Henry A '89–'90	10 00	
Boyce, Samuel F. '89	5 00	
Boyd, George W. '89	5 00	
Boyden, Edward C. '89	5 00	
Boyer, Harry '89	5 00	
Boynton, Herschell '89	5 00	
Brack, Charles. '89	5 00	
Brackett, Aurick S. '89	5 00	
Bradley, James W '89–'90	10 00	
Brand, Erich. '89	5 00	
Brant, Edmund W '87	5 00	
Brewster, Wadsworth J '90	5 00	
Bristol, Charles E '90	5 00	
Brooks, George W '90	5 00	
Brown, Albert E '89	5 00	
Brown, Albert P '89	5 00	
Brown, Henry J '89–'90	10 00	
Brown, James '89–'90	10 00	
Brown, Robert J '89	5 00	
Bruck, Philip H '90	5 00	
Bruguier, Francis '89	5 00	
Brundage, Fred '89	5 00	
Brunswig, Lucien N '89–'90	10 00	
Bryant, Randolph F '89	5 00	
Bryant, William C '90	5 00	
Buck, George '89	5 00	
Buck, John '89	5 00	
Buck, John L '89	5 00	
Buehler, John J '89	5 00	
Bunker, Elihu '90	5 00	
Bunting, Samuel S '90	5 00	
Burg, John D '89–'90	10 00	
Burge, James O '89	5 00	
Burkhardt, Mark A '89	5 00	
Burns, J. Kellar '89	5 00	
Burrough, Horace '90	5 00	
Amount carried forward.	$650 00	$25 00

		Annual Dues.	Certificates.
Amount brought forward		$650 00	$25 00
Burroughs, Silas M.	'89	5 00	
Bury, Edward B	'88–'89	10 00	
Butler, Charles H	'90	5 00	
Butler, Freeman H.	'90	5 00	
Button, Charles E	'89	5 00	
Caldwell, James W	'90	5 00	
Calvert, John	'89	5 00	
Campbell, Samuel	'89-'90	10 00	
Candidus, Philip C.	'89	5 00	
Carpenter, Samuel W.	'88–'89–'90	15 00	
Carrell, Eugene A	'89	5 00	
Carslake, George M	'89–'90	10 00	
Caspari, Charles, Jr	'90	5 00	
Casper, Thomas J	'90	5 00	
Catlin, Ephron	'90	5 00	
Chalin, Louis F	'89	5 00	
Chandler, Charles F	'89-'90	10 00	
Chandler, I. Eugene	'89	5 00	
Chapin, William A.	'90	5 00	
Chapman, Isaac Ç.	'89	5 00	
Choate, John	'90	5 00	
Christiani, Charles	'89	5 00	
Church, Howard M	'89	5 00	
Clapp, George H.	'89	5 00	
Clarke, Louis G.	'89	5 00	
Clarke, William B	'90	5 00	
Clement, Henry B	'90	5 00	
Close, George C	'89	5 00	
Cobb, Ralph L	'89	5 00	
Coblentz, Virgil	'89	5 00	
Colcord, Joseph W.	'89	5 00	
Cole, Charles M	'89	5 00	
Cole, Howson W	'90	5 00	
Colgan, John	'89	5 00	
Collins, Albert B	'90	5 00	
Colton, James B.	'89	5 00	
Cone, John W.	'90	5 00	
Conger, Frederic A	'89	5 00	
Conrad, John	'89	5 00	
Conrath, Adam	'90	5 00	
Cook, Gilbert S	'89	5 00	
Cook, Harry C	'90	5 00	
Cook, Thomas P.	'90	5 00	
Copeland, John D	'89	5 00	
Cornell, Edward A.	'89	5 00	
Cowdin, George H	'90	5 00	
Craighill, Ed. A	'90	5 00	
Cramer, Max	'90	5 00	
Crawford, Thomas D	'89	5 00	
Crolius, Frank M	'90	5 00	
Crona, Sixtus E. S.	'89	5 00	
Crossman, George A.	'90	5 00	
Culbreth, David M. R.	'89	5 00	
Cummings, Theodore F	'89	5 00	
Curtiss, Charles G.	'89	5 00	
Cushman, Henry C.	'89	5 00	
Dadd, John A.	'90	5 00	
Dana, Edmund, Jr.	'90	5 00	
Dare, Charles F	'89	5 00	
Darrough, Charles H	'89	5 00	
Daubach, Charles J	'89	5 00	
Davenport, Bennett F	'89	5 00	
Davis, Benjamin	'89	5 00	
Davis, Edward H	'90	5 00	
Davis, William M	'90	5 00	
Davison, John T.	'90	5 00	
Dawson, Edward S., Jr	'90	5 00	
Dawson, John H	'89	5 00	
Day, Charles W.	'89	5 00	
De Cou, James C.	'89–'90	10 00	
De Forest, William P	'89	5 00	
De Graff, David	'89	5 00	
DeLang, Alfred	'89	5 00	
Dedrick, William F	'89	5 00	
Deibert, Thomas I.	'89	5 00	
Denham, Charles S	'90	5 00	
Amount carried forward		$1065 00	$25 00
Amount brought forward		$1065 00	$25 00
Dennin, Charles.	'90	5 00	
Deutsch, Julius W.	'89	5 00	
Devine, John	'89	5 00	
Dewoody, William L.	'90	5 00	
Dick, Dundas	'89–'90	10 00	
Diehl, C. Lewis	'89	5 00	
Dietrick, H Dixon	'89	5 00	
Dikeman, Nathan	'89	5 00	
Dilly, Oscar C.	'89	5 00	
Dimock, Robert H.	'89–'90	10 00	5 00
Dinsmore, George F.	'85	5 00	
Ditman, Andrew J.	'89	5 00	
Dobbins, Edward T	'90	5 00	
Dodd, Simon W.	'89	5 00	
Dohme, Charles E.	'90	5 00	
Dohme, Louis	'90	5 00	
Dolan, Frank L	'89	5 00	
Dolloff, Albert S.	'89	5 00	
Dougherty, Samuel E	'89	5 00	
Douglass, Henry, Jr	'89	5 00	
Downing, Benjamin F., Jr	'89	5 00	
Drake, Charles W	'89	5 00	
Drake, Jonathan B.	'88–'89	10 00	
Drake, John R.	'90	5 00	
Drefs, Charles A.	'89	5 00	
Dresser, George E	'89	5 00	
Driggs, Charles M.	'89	5 00	
Druehl, Frank A.	'89	5 00	
Drury, John S.	'89	5 00	
Duble, Jesse B.	'89	5 00	
Duckett, Walter G.	'89	5 00	
Dudley, Oscar E	'89-'90	10 00	
Dunagan, Jesse J.	'89	5 00	
Duncan, Thurston B.	'89	5 00	
Dunn, John A.	'90	5 00	
Dupont, William	'90	5 00	
Durban, Sebastian C	'86	5 00	
Durkee, William C.	'90	5 00	
Easton, Luther W	'89	5 00	
Ebbitt, William H.	'89	5 00	
Eberbach, Ottmar	'90	5 00	
Eberle, Charles L	'89	5 00	
Eccles, Robert G.	'90	5 00	
Eckford, Joseph W.	'89	5 00	
Eddy, Henry C	'89	5 00	
Edwards, Nathan W.	'89	5 00	
Edwards, William F.	'89	5 00	
Eger, George	'89	5 00	
Eggers, Frederick H	'89-'90	10 00	
Eimer, Charles	'89–'90	10 00	
Ekman, N. Adolf	'89	5 00	
Elfers, Joseph C.	'89	5 00	
Eliel, Leo	'89	5 00	
Elliott, Henry A	'90	5 00	
Emanuel, Louis	'89	5 00	
Emich Columbus V.	'90	5 00	
England, Robert.	'89–'90	10 00	
Erwin, James J	'89	5 00	
Eschman, Clemens L.	'89	5 00	
Eschmann, F. W. R.	'89	5 00	
Estabrook, Henry A.	'89	5 00	
Estes, Joseph J	'90	5 00	
Evans, Joseph S.	'90	5 00	
Evans, Samuel B.	'89	5 00	
Ewing, Frederic C.	'89	5 00	7 50
Eyssell, George	'89–'90	10 00	
Fahlen, Julius	'89–'90	10 00	
Fairchild, Benjamin T	'89–'90	10 00	
Fairchild, Samuel W.	'89–'90	10 00	
Farlow, John B	'89	5 00	
Fay, Hamilton	'89-'9	10 00	
Feemster, Joseph H	'89	5 00	
Feil, Joseph.	'89	5 00	
Fennel, Charles T. P.	'90	5 00	
Fink, Frederick W	'89–'90	10 00	
Finlay, Alexander K	'89	5 00	
Amount carried forward		$1510 00	$37 50

	Annual Dues.	Certificates.
Amount brought forward . . .	$1510 00	$37 50
Finley, Norval H. '89	5 00	5 00
Finnerty, Edward J., Jr. '89–'90	10 00	
Fischer, Phil. '89	5 00	
Fisher, William '89	5 00	
Flanagan, Lewis C. '90	5 00	
Fleck, Jacob J. '90	5 00	
Fleischer, Adolf T. '89	5 00	
Fleischmann, Augustus T. '89	5 00	
Flint, George B. '89–'90	10 00	
Flint, John H. '89	5 00	
Ford, Charles M. '89	5 00	
Ford, W. Thomas '89	5 00	
Forsyth, James '89	5 00	
Foster, William O. '90	5 00	
Foulke, James '89	5 00	
Fox, Peter P. '88	5 00	
Francis, Walter R. '90	5 00	
Franklin, Philip H. '89	5 00	
Fraser, Horatio N. '89–'90	10 00	5 00
Fraser, Robert P. '89	5 00	
French, William B. '90	5 00	
Frere, Alexander G. '89	5 00	
Frizelle, Seymour F. '89	5 00	
Frohwein, Richard '89	5 00	
Früh, Carl D. S. '89	5 00	
Frye, George C. '89–'90	10 00	
Fuller, Henry W. '89–'90	10 00	
Gallagher, John A. '89	5 00	
Galloway, David H. '89–'90	10 00	
Galt, Edward P. '89–'90	10 00	
Gardner, Robert W. '89	5 00	
Garrison, Herod D. '89	5 00	
Gates, Howard E. '89–'90	10 00	
Gaus, Charles H. '90	5 00	
Gaus, Louis H. '90	5 00	
Gegelein, Frederick L. '89	5 00	
Geier, Oscar W. '89	5 00	
Geisler, Joseph F. '89	5 00	
Gerhard, Samuel '88–'89	10 00	
Gessner, Emil A. '90	5 00	
Gibson, Charles '90	5 00	
Gibson, James E. '89	5 00	
Giles, William M. '89	5 00	
Gill, George '90	5 00	
Gilpin, Henry B. '89–'90	10 00	
Glines, George W. '89	5 00	
Godbold, Fabius C. '90	5 00	
Godding, Edward R. '89	5 00	
Godding, John G. '90	5 00	
Goebel, Edward '89	5 00	
Good, James M. '90	5 00	
Goodale, Thomas T. '87–'88–'89	15 00	
Goodwin, Eugene R. '89	5 00	
Gosman, Adam J. '90	5 00	
Graham, Willis H. '90	5 00	
Grandjean, Charles '90	5 00	
Grandjean, Eugene '90	5 00	
Grant, Albert W. '89	5 00	
Grassly, Charles W. '89	5 00	
Gray, Gilbert D. '89	5 00	
Gray, Henry R. '89	5 00	
Gray, William H. '89	5 00	
Green, Arthur L '89–'90	10 00	
Green, Benjamin '89	5 00	
Green, Robert M '89	5 00	7 50
Gregory, Edmund '90	5 00	
Gregory, Willis G. '89	5 00	
Greve, Charles M. '90	5 00	
Greyer, Julius '90	5 00	
Griffin, Horace M '89	5 00	
Griffith, Albert R. '89	5 00	
Gross, Edward Z. '90	5 00	
Grossklaus, John F. '90	5 00	
Grosvenor, Daniel P. '89	5 00	
Gundrum, George '89	5 00	
Gutierriez, Antonio G. '89–'90	10 00	7 50
Amount carried forward . . .	$1960 00	$62 50

	Annual Dues.	Certificates.
Amount brought forward . . .	$1960 00	$62 50
Haass, G. Herman. '90	[illegible] 00	
Hadley, Frank R. '89–'90	10 00	
Haenchen, Charles E. '89	5 00	
Haeusgen, H. Otto '89	5 00	
Haigh, De Lagnel '89	5 00	
Haight, William B. '89	5 00	
Hall, Charles E. '89	5 00	
Hall, Charles K. '90	5 00	
Hall, Edwin B. '90	5 00	
Hall, Marshall C. '90	5 00	
Hall, William A. '89	5 00	
Hallberg, Carl S. N. '88–'89	10 00	
Hance, Edward H. '90	5 00	
Hancock, Charles W. '89–'90	10 00	
Hancock, Franklin W. '89	5 00	
Hanson, Arthur E. '89	5 00	
Hardigg, William L. '89	5 00	
Hardin, John H. '89	5 00	
Harlow, Noah S. '90	5 00	
Harrington, Frank '89	5 00	
Harrison, Jacob H. '89–'90	10 00	
Hartshorn, Frederick A. '90	5 00	
Hartwig, Charles F. '89-90	10 00	
Hassebrock, Henry F. '90	5 00	
Hassinger, Samuel E. R. '89–'90	10 00	
Hastings, Benjamin '89	5 00	
Hattenhauer, Robert C. '90	5 00	
Hatton, Edgar M. '89	5 00	
Hauenstein, William '89–'90	10 00	
Haussamen, Henry L. '89	5 00	
Hawkins, Henry '89	5 00	
Hawkins, M. Smith '90	5 00	
Hay, Edward A. '89–'90	10 00	5 00
Hayes, Horace P. '89	5 00	
Haynes, David O. '89–'90	10 00	
Hays, B. Frank '87–'88–'89–'90	20 00	
Hays, David '87–'88–'89	15 00	
Heckler, George L. '89	5 00	
Hegeman, J. Niven '89	5 00	
Heinitsh, Sigmund W. '89	5 00	
Helke, William L. '89	5 00	
Hemm, Francis. '90	5 00	
Henderson, Archibald K. '89	5 00	
Henes, William F. '89	5 00	7 50
Hening, James C. '89	5 00	
Henry, Charles '90	5 00	
Hepburn, John '89	5 00	
Herbst, Frederick W. '90	5 00	
Hermann, Frederick F. '89–'90	10 00	
Heydenreich, Emile '89–'90	10 00	
Higgins, James S. '89	5 00	
Hilby, Francis M. '89	5 00	
Hildreth, Newton G. '90	5 00	
Hill, Justin L. '89	5 00	
Hilt, David '89	5 00	
Hinsdale, Samuel J. '89	5 00	
Hodgkins, Bert W. '90	5 00	
Hodgkins, Israel M. '89–'90	10 00	
Hoffman, Julius '89	5 00	
Hoffman, Otto L. '89–'90	10 00	
Hogey, Julius H. '90	5 00	
Hohenthal, Charles F. L '89-'90	10 00	
Holden, Isaac D. '89–'90	10 00	
Holland, Samuel S. '90	5 00	
Hollister, Albert H. '90	5 00	
Holmes, Clayton W. '90	5 00	
Holmes, Henry E. '90	5 00	
Holt, Alvin E. '90	5 00	
Homer, John '89	5 00	
Hood, Charles I. '90	5 00	
Hopp, Lewis C. '89	5 00	
Hoskinson, J. Thomas, Jr. '89–90	10 00	
Howson, Arthur B. '90	5 00	
Howson, Walter H. '90	5 00	
Hoyt, George M. '89	5 00	
Hubbard, John H. '90	5 00	
Amount carried forward . . .	$2445 00	$75 00

		Annual Dues.	Certificates.
Amount brought forward		$2445 00	$75 00
Huested, Alfred B	'90	5 00	
Hughes, Albert E	'89	5 00	
Hulting, Fred. B.	'89	5 00	
Hunt, Denis D.	'89	5 00	
Huston, Charles	'90	5 00	
Hutchins, Isaiah.	'90	5 00	
Hyler, William H	'89	5 00	
Ihlefeld, Conrad H	'89–'90	10 00	
Ingalls, Albert O.	'89	5 00	
Inglis, Frank	'89	5 00	
Ink, Charles E.	'89	5 00	
Inman, Charles T	'89	5 00	
Irvin, William A.	'90	5 00	
Jackson, Edward C.	'86–'87–'88	15 00	
Jacobus, Judson S	'89	5 00	
James, Frank L	'89	5 00	
James, William T	'89	5 00	
Jamieson, Thomas N.	'89	5 00	
Jennings, N. Hynson.	'89	5 00	
Jesson, Jacob	'89	5 00	
Joergensen, Sophus.	'89–'90	10 00	7 50
Johnson, Arthur S	'89	5 00	
Johnson, Charles B.	'90	5 00	
Johnston, Harry A.	'89	5 00	
Jones, Alexander H	'89–'90	10 00	
Jones, Daniel S	'89–'90	10 00	
Jones, John, Jr	'89–'90	10 00	
Jones, Samuel S	'89–'90	10 00	
Jones, Simon N	'89	5 00	
Jordan, Francis	'89	5 00	
Jungkind, John A	'89	5 00	
Jungmann, Julius	'89–'90	10 00	
Kalish, Julius	'89–'90	10 00	
Karb, George J	'90	5 00	
Karrmann, William	'89	5 00	
Kauffman, George B.	'90	5 00	
Keeler, William H.	'89	5 00	
Keene, Thomas R	'89	5 00	
Keeney, Caleb R.	'89–'90	10 00	
Keil, Fred. C	'89	5 00	
Keller, Fred. P. P	'89	5 00	
Kelley, Edward S	'90	5 00	
Kellogg, Gardner	'89	5 00	
Kelly, George A	'90	5 00	
Kemp, Edward.	'89–'90	10 00	
Kennedy, Ewen C	'89–'90	10 00	
Kennedy, Ezra J.	'89	5 00	
Kennedy, George W	'89	5 00	
Kent, Henry A , Jr	'89–'90	10 00	
Kephart, Henry	'89–'90	10 00	
Keppler, Christian L.	'89	5 00	
Kerr, William W.	'89	5 00	
Kessler, Edward F.	'89	5 00	
Keys, Roger.	'89	5 00	
Kienth, Hans	'90	5 00	
Kilmer, Frederick B	'89	5 00	
King, Walter B	'89	5 00	
Kirchgasser, William C	'90	5 00	
Kirchhofer, Paul.	'89	5 00	
Kirkland, Derwentwater	'89	5 00	
Kleinschmidt, Anton A.	'89	5 00	
Klie, G. H. Charles	'90	5 00	
Kline, Benjamin M	'89	5 00	
Kline, Mahlon N.	'90	5 00	
Knabe, Gustavus A	'89	5 00	
Knapp, Frank F	'87–'88–'89–'90	20 00	
Knock, Thomas F	'90	5 00	
Knoefel, August	'89	5 00	
Koch, Louis	'89–'90	10 00	
Kochan, John	'89	5 00	
Koehnken, Herman H	'89	5 00	
Kostitch, Stephen T	'89–'90	10 00	
Kostka, Bruno O.	'89–'90	10 00	
Krehe, J. Theodor.	'90	5 00	
Kremers, Edward.	'88–'89–'90	15 00	
Krewson, William E	'89	5 00	
Amount carried forward		$2940 00	$82 50

		Annual Dues.	Certificates.
Amount brought forward		$2940 00	$82 50
Krieger, Philip.	'90	5 00	
Kuhlmeier, Henry	'89	5 00	
Kuhn, Norman A	'90	5 00	
Kurfurst, Henry F	'90	5 00	
Labold, Joseph M.	'89	5 00	
Lachance, Seraphin	'90	5 00	
Lahme, Charles A	'89	5 00	
Laing, Alfred A	'90	5 00	
Lammert, C. Joseph	'89	5 00	
Lander, John C	'89	5 00	
Last, Louis C. A.	'89	5 00	
Laue, John M. A	'89	5 00	
Lauer, Michael J.	'89	5 00	
Lawton, Charles H.	'90	5 00	
Lawton, Horace A	'90	5 00	
Lazell, Lewis T.	'89–'90	10 00	
Lee, James A	'89–'90	10 00	
Lehn, Louis	'89	5 00	
Lehr, Philip	'89	5 00	
Leis, George.	'89	5 00	
Lengfeld, Abraham L	'89	5 00	
Lernhart, August.	'89–'90	10 00	
Levy, Adolph	'89	5 00	
Libby, Henry F.	'88	5 00	
Livingston, Barent V. B	'90	5 00	
Llewellyn, John F	'89	5 00	
Lloyd, John U.	'90	5 00	
Lockhart, George B	'89	5 00	
Loehr, Theodore C.	'89	5 00	
Lord, Frank J	'89–'90	10 00	
Lord, Thomas	'90	5 00	
Lowd, John C	'90	5 00	
Lowden, John	'86-'87-'88-'89-'90	25 00	
Luscomb, William E	'89	5 00	
Lyman, Asahel H	'89	5 00	
Lyons, Albert B	'88–'89–'90	15 00	
Lyons, Isaac L.	'90	5 00	
Macdonald, Daniel T	'90	5 00	
Maclagan, Henry	'89	5 00	
Maclise, James.	'89–'90	10 00	
Macmahan, Thomas J	'89	5 00	
Main, Thomas F.	'90	5 00	
Maisch, Henry C. C	'90	5 00	
Majer, Oscar.	'89	5 00	
Major, John R.	'89	5 00	
Mallinckrodt, Edward	'90	5 00	
Mann, Albert.	'89–'90	10 00	
Manning, John H	'89	5 00	
Markoe, George F. H	'90	5 00	
Marshall, Ernest C.	'90	5 00	
Martin, Hugo W. C	'89	5 00	
Martin, John C	'89	5 00	
Martin, S. Robert	'89	5 00	
Mason, Alfred H.	'90	5 00	
Massey, William M.	'89–'90	10 00	
Masters, Robert S	'88–'89	10 00	
May, Arthur F.	'89	5 00	
May, James O	'90	5 00	
Mayell, Alfred	'89	5 00	
Maynard, Henry S.	'89	5 00	
McCarthy, Cornelius J	'89	5 00	
McCartney, Winfield S.	'89	5 00	
McClure, William H	'90	5 00	
McDonald, George.	'89	5 00	
McElwee, Emer J.	'89–'90	10 00	
McFarland, Thad. D.	'89	5 00	
McIntyre, Byron F.	'89	5 00	
McIntyre, Ewen	'89–'90	10 00	
McIntyre, William	'90	5 00	
McKelway, George I.	'89–'90	10 00	
McKesson, G. Clinton	'89–'90	10 00	
McKesson, John, Jr	'89–'90	10 00	
McNeil, John M	'89–'90	10 00	
Meininger, Albert	'90	5 00	
Meissner, Paul E.	'90	5 00	
Melchers, Henry	'89	5 00	
Amount carried forward		$3420 00	$82 50

	Annual Dues.	Certificates.
Amount brought forward	$3420 00	$82 50
Menninger, Henry J. '89	5 00	
Mellon, John J. '89	5 00	
Melvin, Samuel H. '89	5 00	
Menkemeller, Charles '89	5 00	
Mennen, Gerhard '89	5 00	
Meyer, Christian F. G. '90	5 00	
Michaelis, Charles O. '89	5 00	
Michaelis, Gustavus '90	5 00	
Milburn, Washington C. '89	5 00	
Miller, Adolph W. '89–'90	10 00	
Miller, Charles G. '89	5 00	
Miller, Jacob A. '90	5 00	
Miller, James M '89	5 00	
Miller, Jason A. '90	5 00	
Miller, Joseph G. '89	5 00	
Miller, Otho F. S. '89	5 00	
Miller, William '89	5 00	5 00
Milligan, Decatur '89–'90	10 00	
Miner, Maurice A. '89	5 00	
Mingay, James '89	5 00	
Miville, Francis C. '89	5 00	
Mohr, Charles '89	5 00	
Moody, Richard H. '88–'89	10 00	
Moore, Joachim B. '89–'90	10 00	
Moore, John T. '90	5 00	
Moore, Thomas F. '89	5 00	
More, Arthur J. '89	5 00	
Morgan, Benjamin G '87–'88–'89	15 00	
Morley, William J. '89	5 00	
Morris, Lemuel I. '89	5 00	
Morrison, Joseph E. '89	5 00	
Mosher, Rosa B. '89	5 00	
Mowry, Albert D. '90	5 00	
Mueller, Adolphus '90	5 00	
Mueller, Otto E. '89	5 00	
Munson, James H. '89–'90	10 00	
Munson, Luzerne I. '89	5 00	
Nattans, Arthur '89	5 00	
Neppach, Stephen A. '89	5 00	
Newbold, Thomas M. '90	5 00	
Newman, George A. '89	5 00	
Nichols, John C. '89	5 00	
Nichols, Thomas B. '89	5 00	
Nipgen, John A. '90	5 00	
Nisbet, William W. '89	5 00	
Norton, Lenis E. '89	5 00	
O'Brien, James J. '89	5 00	
O'Neil, Henry M. '89	5 00	
Oberdeener, Samuel '89–'90	10 00	
Ohliger, Lewis P. '89	5 00	
Oldberg, Oscar '89	5 00	
Oleson, Olaf M. '89	5 00	
Oliver, William M. '88–'89	10 00	
Orne, Joel S. '90	5 00	
Osgood, Hugh H. '89	5 00	
Osmun, Charles A. '89–'90	10 00	
Otis, Clark Z '89	5 00	
Ottinger, James J. '90	5 00	
Owens, James A. '90	5 00	
Owens, Richard J. '90	5 00	
Padley, William A. '89	5 00	
Paine, Milton K. '89	5 00	
Painter, Emlen '89	5 00	
Parcher, George A. '90	5 00	
Parker, George H. '90	5 00	
Parker, John H. '89	5 00	
Parkill, Stanley E. '89	5 00	
Parsons, John '89–'90	10 00	
Patch, Edgar L. '90	5 00	
Patton, John F. '90	5 00	
Patterson, Theodore H. '89	5 00	
Pauley, Frank C. '90	5 00	
Pease, Francis M. '90	5 00	
Peck, George L. '90	5 00	
Pennington, T. H. Sands '89	5 00	
Perkins, Benjamin A. '90	5 00	
Amount carried forward	$3855 00	$87 50
Amount brought forward	$3855 00	$87 50
Perkins, William A. '90	5 00	
Perry, F. W. R. '89	5 00	
Pettengill, Edward T. '89	5 00	
Pettit, Henry M. '89	5 00	
Peyton, Robert D. '89	5 00	
Pfingst, Edward C. '89	5 00	
Pfingst, Henry A. '89	5 00	
Pfingsten, Gustavus '89–'90	10 00	
Pfunder, William '89	5 00	
Phelps, Dwight '89	5 00	
Phillips, Charles W. '89–'90	10 00	
Physick, Henry S. '89	5 00	
Pickett, John H. '89	5 00	
Pierce, William H. '89–'90	10 00	
Pile, Gustavus '89	5 00	
Pitt, John R., Jr. '89–'90	10 00	
Plummer, David G. '89–'90	10 00	
Plummer, Edward '89	5 00	
Poehner, Adolph A. '89–'90	10 00	5 00
Porter, Chilton S. '89	5 00	
Porter, Henry C. '90	5 00	
Post, Elisha '90	5 00	
Potterfield, Clarence A. '89	5 00	
Powell, Robert B. '89–'90	10 00	
Powell, Thomas W. '89	5 00	
Power, Frederick B. '90	5 00	
Prall, Delbert E. '89	5 00	
Prescott, Albert B. '90	5 00	
Preston, Andrew P. '89–'90	10 00	
Preston, Calvin W. '89–'90	10 00	
Preston, David '89	5 00	
Price, Charles A. '89	5 00	7 50
Price, Charles H. '89	5 00	
Price, Joseph '89	5 00	
Prieson, Adolph '89–'90	10 00	
Procter, Wallace '89	5 00	
Puckner, William A. '89	5 00	
Punch, William F. '88–'89	10 00	
Pyle, Cyrus '89	5 00	
Quackinbush, Benjamin F. '89–'90	10 00	
Qvale, Victor A. '89	5 00	
Rademaker, Herman H. '89	5 00	
Ramsperger, Gustavus '90	5 00	
Rankin, Jesse W. '89	5 00	
Rascoe, Lucius '89	5 00	
Ray, Frederick E. '89–'90	10 00	
Redsecker, Jacob H. '89	5 00	
Reed, Isaac N. '90	5 00	
Reichardt, F. Alfred '89–'90	10 00	
Renz, Frederick J. '89	5 00	
Reynolds, Charles E. '89	5 00	
Reynolds, Howard P. '90	5 00	
Reynolds, John J. '89	5 00	
Rhoades, Stephen H. '90	5 00	
Rhode, Rudolph E. '90	5 00	
Ricksecker, Theodore '89–'90	10 00	
Riesenman, Joseph '89	5 00	
Riley, Charles W. '89	5 00	
Rives, Edward B. '89	5 00	
Robbins, Alonzo '90	5 00	
Roberts, Daniel J. '89	5 00	
Robertson, Archibald C. '89–'90	10 00	
Robin, Oscar '89	5 00	
Robinson, Edward A. '90	5 00	
Robinson, Ernest F. '89	5 00	
Robinson, James S. '89	5 00	
Rogers, Arthur H. '89	5 00	
Rogers, Wiley '89	5 00	
Rogers, William H. '90	5 00	
Rohde, Claus F. '89	5 00	
Rometch, Frederick A. '89	5 00	
Rosengarten, Mitchell G. '90	5 00	
Rosewater, Nathan '86	5 00	
Ross, William H. '89	5 00	
Rudolf, Eliza '89	5 00	
Ruete, Theodore W. '89	5 00	
Amount carried forward	$4315 00	$100 00

	Annual Dues.	Certificates.
Amount brought forward	$4315 00	$100 00
Rumsey, Samuel L. '85-'86-'87-'88-'89-'90	30 00	
Runyon, Edward W. '89	5 0	
Ruppert, John '90	5 00	
Rust, William '89-'90	10 00	
Ryerson, Henry O. '90	5 00	
Sanderson, Stephen F. '89	5 00	
Sands, George G. '89-'90	10 00	
Sargent, Ezekiel '89-'90	10 00	
Sauer, Louis W '89	5 00	
Sauerhering, Rudolph A. '90	5 00	
Saunders, William '89	5 00	
Sautter, Louis. '90	5 00	
Sawyer, William F. '89	5 00	
Sayre, Edward A. '89	5 00	
Sayre, Lucius E. '90	5 00	
Sayre, William H '89	5 00	
Schaaf, Justus H. '90	5 00	
Schafer, George H. '89	5 00	
Schafhirt, Adolf J '89	5 00	
Schambs, George M '89	5 00	
Scheffer, Emil '89	5 00	
Scheffer, Henry W. '89-'90	10 00	
Schellentrager, E. A '89	5 00	
Scherer, Andrew '89	5 00	
Scherff, John P '90	5 00	
Scherling, Gustav '89	5 00	
Schermerhorn, Winfield S '90	5 00	
Schiemann, Edward B '89	5 00	
Schlaepfer, Henry J '90	5 00	
Schley, Steiner '89	5 00	
Schlotterbeck, Julius O. '89	5 00	
Schmid, Henry '89-'90	10 00	
Schmidt, Ferdinand T '89-'90	10 00	
Schmidt, Florian C. '89	5 00	
Schmidt, Frederick M '89	5 00	
Schmidt, Valentine. '89	5 00	
Schmitt, Joseph M. '90	5 00	
Schoenhut, Christian H '89	5 00	
Schoettlin, Albert J '89	5 00	
Scholtz, Edmund L. '89	5 00	
Schranck, C. Henry '90	5 00	
Schreck, Leo S '89	5 00	
Schueller, Ernst. '90	5 00	
Schueller, Frederick W '90	5 00	
Schumann, Theodore '87-'88	10 00	
Scofield, James S '89	5 00	
Scott, George T '89	5 00	
Scott, William H. '89-'90	10 00	
Scoville, Charles H '89	5 00	
Scribner, John C. '89-'99	10 00	7 50
Searby, William M. '89	5 00	
Sedberry, Bond E '89	5 00	
Seitz, Oscar '89	5 00	
Sennewald, Ferdinand W '90	5 00	
Serodino, Herman '89	5 00	
Sevin, N. Douglass '89	5 00	
Sharples, Stephen P. '90	5 00	
Sherman, Charles R '89	5 00	7 50
Sherwin, Eugene A. '89-'90	10 00	5 00
Sherwood, Louis W '90	5 00	
Shiels, George E '89-'90	10 00	
Shinn, James T '90	5 00	
Shivers, Charles. '89	5 00	
Shoemaker, Richard M. '90	5 00	
Shreve, John A '89	5 00	
Shriver, Henry '89	5 00	
Shurtleff, Israel H. '90	5 00	
Siegemund, Charles A '89-'90	10 00	
Simmon, Karl '89	5 00	
Simms, Giles G. C. '89	5 00	
Simon, William '90	5 00	
Simonson, William '90	5 00	
Simpson, William '89	5 00	
Skelly, James J '89-'90	10 00	
Slater, Frank H. '90	5 00	
Amount carried forward	$4780 00	$120 00
Amount brought forward	$4780 00	$120 00
Slocum, Frank W '89	5 00	
Slosson, George '89	5 00	
Smink, William H. R. '89	5 00	
Smith, Amasa D. '89	5 00	
Smith, Charles B. '89	5 00	
Smith, Edward N '89	5 00	
Smith, Henry '89	5 00	
Smith, Israel P. '89	5 00	
Smith, J. Hungerford '89	5 00	
Smith, Joseph S '89	5 00	
Smith, Linton '90	5 00	
Smith, Samuel W. '89-'90	10 00	7 50
Smith, Willard A. '89	5 00	
Smith, William C '89-'90	10 00	
Sniteman, Charles C. '89	5 00	
Snively, Andrew J. '89	5 00	
Snow, Charles W '90	5 00	
Snow, Herbert W '89-'90	10 00	
Snyder, Robert J '89	5 00	
Soetje, Edward C '89	5 00	
Sohn, Frank. '89-'90	10 00	
Sohrbeck, G. Henry '89	5 00	
Sombart, John E. '89	5 00	
Spalding, Warren A '90	5 00	
Spangler, H. W '89	5 00	
Spannagel, Charles C. '89-'90	10 00	
Spengler, John G. '89	5 00	
Spenzer, Peter I '89	5 00	
Sperry, Herman J '90	5 00	
Spofford, Charles B '89	5 00	
Squibb, Edward H. '90	5 00	
Squibb, Edward R. '90	5 00	
Stahler, William '90	5 00	
Stahlhuth, Ernst H. W. '89	5 00	
Stam, Colin F '89	5 00	
Stamford, William H. '89	5 00	
Stanley, E. C '89	5 00	
Starr, Thomas '89-'90	10 00	
Stearns, Henry A '89	5 00	
Steele, James G '89	5 00	
Stein, Jacob H. '90	5 00	
Steinhauer, Frederick '89	5 00	
Stevens, Alonzo B. '90	5 00	
Stevens, Fred. D. '89	5 00	
Stevens, Luther F '89	5 00	
Stewart, Francis E. '89	5 00	
Stone, Clarence G '89-'90	10 00	
Stone, Maurice L. '90-'91	10 00	
Stowell, Daniel '89	5 00	
Strachan, William E. '89	5 00	
Strassel, William '89	5 00	
Stryker, Cornelius W '89	5 00	
Sweet, Caldwell '89-'90	10 00	
Tanner, John G '89	5 00	
Taylor, James H. '89	5 00	
Taylor, John P '90	5 00	
Test, Alfred W '89	5 00	
Thatcher, Hervey D. '90	5 00	
Thomas, Oscar E. '87-'88-'89	15 00	
Thomas, Robert, Jr '89	5 00	
Thompson, Frank A. '89	5 00	
Thompson, William Scott '89	5 00	
Thompson, William Silver '90	5 00	
Thorn, Henry P. '90	5 00	
Thurston, Azor '90	5 00	
Tiarks, Herman '89-'90	10 00	
Tilyard, Charles S '89	5 00	
Tobey, Charles W. '89	5 00	
Tobin, John M. '88-'89-'90	15 00	7 50
Todd, Albert M '90	5 00	
Topley, James '90	5 00	
Torbert, Willard H '90	5 00	
Trask, Charles M '90	5 00	
Travis, J. Walton '89	5 00	
Travis, Miles B '89	5 00	
Treat, Joseph A. '90	5 00	
Amount carried forward	$5230 00	$135 00

	Annual Dues.	Certificates.
Amount brought forward . . .	$5230 00	$135 00
Trimble, Henry . . . . '90	5 00	
Truax, Charles . . . . . '89–'90	10 00	
Tscheppe, Adolph . . . . . . '89	5 00	
Tucker, Mosely F. . . . . . . '89	5 00	
Turner, George H. . . . . . '90	5 00	
Uhlich, Ferdinand G. . . . . '90	5 00	
Upson, Rosa . . . . '89	5 00	
Van Antwerp, Garet . . . . . '89	5 00	
Van Auken, Jerrie A. . . . . '89	5 00	
Vandegrift, John A. . . . . '89	5 00	
Van Winkle, Abraham W. . . '89	5 00	
Vaughn, Perry W. . . . . . . '89	5 00	
Vennard, William L. . . . '89–'90	10 00	
Viall, William A. . . . . . . '89	5 00	
Viallon, Paul L. . . . . '89	5 00	5 00
Vilter, Herman T. . . . . . . '90	5 00	
Vogt, Diedrich . . . . '89	5 00	
Vordick, August H. . . . . . '90	5 00	
Wagner, George W. . . . . . '89	5 00	
Wagner, Henry . . . . . . '90	5 00	
Wahmhoff, Julius H. . . . . '89	5 00	
Walch, Robert H. . . . . '89–'90	10 00	
Walker, Anselle . . . . '90	5 00	
Walker, John P. . . . . . . '90	5 00	
Walker, William J. . . . . . '90	5 00	
Wall, Otto A. . . . . '89	5 00	
Walton, Joseph R. . . . . . '89	5 00	
Wangler, Conrad D. . . . . . '90	5 00	
Ward, Benjamin . . . . '89	5 00	
Warn, William E. . . . . . . '90	5 00	
Warren, Edwin A. . . . . . '89	5 00	
Warren, William M. . . . '89–'90	10 00	
Watson, Herbert K. . . . . . '89	5 00	
Watson, Sidney P. . . . . . '90	5 00	
Waugh, George J. . . . . . '89	5 00	
Weaver, John A. . . . . . '90	5 00	
Webb, William H. . . . . . '90	5 00	
Weber, William . . . . '89	5 00	
Wehrly, Thomas M. . . . . '89	5 00	
Weichsel, Francis . . . . '89–'90	10 00	
Weidemann, Charles A. . '89–'90	10 00	
Weinman, Oscar C. . . . '89–'90	10 00	
Weiser, Emilius I. . . . . . . '90	5 00	
Welch, Willard C. . . . . . . '89	5 00	
Wellcome, Henry S. . . . . '89	5 00	
Wellington, Arthur W. . . . '89	5 00	
Wells, Ebenezer M. . . . . . '89	5 00	
Wells, Jacob D. . . . . '90	5 00	
Wells, Romanta . . . . '90	5 00	
Wendel, Henry E. . . . . '89–'90	10 00	
Amount carried forward . . .	$5520 00	$140 00
Amount brought forward . . .	$5520 00	$140 00
Wenzell, William T. . . . . '89	5 00	
Weschcke, Carl . . . . '89	5 00	
Westmann, F. H. . . . . '90	5 00	
Wetterstroem, Albert . . . . '89	5 00	
Whall, Joseph S. . . . . . . '89	5 00	
Wheeler, Leonard H. . . . . '90	5 00	
Whelpley, Henry M. . . . '89–'90	10 00	
Whitcomb, Frederick E. . '89–'90	10 00	
White, George H. . . . . . . '90	5 00	
White, Richard E. . . . . . . '89	5 00	
Whiting, Frederick T. . . . . '90	5 00	
Whitman, Nelson S. . . . . '90	5 00	
Whitney, Henry M. . . . . . . '90	5 00	
Wichelus, Frederick . . . . . '89	5 00	
Wickham, William H. . . '89–'90	10 00	
Wienges, Conrad . . . . '89–'90	10 00	
Wight, Oscar M. . . . . . '89	5 00	
Wilcox, Frederick . . . . . . '89	5 00	
Wilkes, Arthur P. . . . . . . '89	5 00	
Wilkins, Frank M. . . . . . '89	5 00	
Williams, Charles F. . . . '89–'90	10 00	
Williams, Duane B. . . . . . '89	5 00	
Williams, George G. . . . . . '89	5 00	
Williams, Seward W. . . '89–'90	10 00	
Williams, William H. . . . . '89	5 00	
Wilson, Benjamin O. . . . . '90	5 00	
Wilson, Frank M. . . . . '90	5 00	
Wilson, Julius H. . . . . '89	5 00	
Wilson, William . '87–'88–'89–'90	20 00	
Winter, Jonas . . . . . . '89–'90	10 00	
Wohlfarth, Justin . . . . . . '89	5 00	
Wolfe, Nathaniel . . . . . . '89	5 00	
Wood, Mason B. . . . . . . '89	5 00	
Woodard, Charles H. . . . . '89	5 00	
Woodruff, Roderick S. . . . '89	5 00	
Woodward, William F. . '89–'90	10 00	
Wooldridge, Napoleon . . . '89	5 00	
Wray, George B. . . . . '89	5 00	
Wright, Archibald W. . . . . '89	5 00	
Wright, Edward E. . . . . . . '90	5 00	
Yeager, Alvin A. . . . . . . '89	5 00	
Yorston, Matthew M. . . . . '89	5 00	
Youngs, William . . . . . . '89	5 00	
Zahn, Emil A. . . . . '89	5 00	
Zeller, William S. . . . . '89	5 00	
Zellhoefer, George . . . . '89–'90	10 00	
Ziegler, Philip M. . . . . '90	5 00	
Zuenkeler, J. Ferd. . . . . . '90	5 00	
Zwick, George A. . . . . '90	5 00	
Total	$5825 00	$140 00

ENTERTAINMENTS.

Ample accommodations had been provided by the Arrangement Committee at the spacious Hygeia Hotel, where, during the latter part of the first week in September, the members began to make their appearance. Early on Sunday morning, September 7th, the steamer *Carolina*, from Baltimore, landed a party at the hotel, and during the afternoon a party from farther east arrived, having sailed from New York by sea to Norfolk. Most of the western members reached the place of meeting on Sunday evening, having come from Cincinnati by rail over the picturesque Chesapeake & Ohio Railroad; while many of the members from New England, who had taken the steamer at Boston for a sea voyage, were detained by fog, and did not arrive until early on Tuesday morning. Many of the southern members who came by rail, had likewise been detained on the road, causing an unlooked-for postponement in their arrival. All were comfortably installed in the hotel, whence attractive views are had over Fortress Monroe, the Chesapeake Bay and Hampton Roads, many of the points being of historical interest. Considering the locality and its surroundings it was strange that, during their stay, quite a number of the visitors were for a time troubled with gastric disturbances; however, the majority escaped such an inconvenience.

The neighboring fort was frequently visited to see the grounds and works, or to witness the drills or parades of the garrison. Carriage drives were taken through the surrounding country, and frequent visits were made to the village of Hampton, its churches and schools, the Soldiers' Home, and the National Cemetery. The briny waters of the bay invited to sailing and fishing excursions, and conjointly with the warm atmosphere, rendered bathing and swimming a pleasurable exercise. Monday evening was devoted to a reception in the ball-room, combined with music from the military band, and followed by dancing. At the entertainment on Wednesday evening the principal attraction was a picked choir from the Hampton Institute, with their quaint songs. Thursday morning saw the members prepared for an excursion by steamer to Norfolk, and thence by rail to Virginia Beach, the famous seashore resort on the Atlantic Ocean. This was a departure from the usual custom of not having any diversion from business, except for the ladies, during the day-time, until after the final adjournment. Similar arrangements may probably be made on other occasions, devoting an hour or so to a visit to some point of interest near the place of meeting; if such an opportunity be not given to the visiting members, they are apt to make such visits at a time set apart for the sessions.

After the final adjournment on Friday, most of the members left Old Point Comfort, shortly after noon, by special train for Richmond, where they found carriages in waiting for a drive of several hours through the most interesting parts of that interesting city. The drive over, a number of the visitors had to commence their homeward journey; but the largest number remained over night at the Exchange Hotel, and on Saturday morning boarded the train which was to convey them to the famous Natural Bridge, which, owing to obstruction from a wrecked train, was reached later than had been expected. The chasm and the cataracts were seen at night illuminated by colored flames, causing a magnificent spectacle, and were visited again on the following morning. Again a number of the party had to separate, but more than one hundred took a special train for Luray, arriving there Sunday evening. The celebrated caverns were visited by many during the night, to enable them to take a morning train towards home; while others tarried at charming Luray Inn for a day or two, before completing their homeward trip, or visiting White Sulphur Springs, Washington, or other places of interest.

LIST OF NEW MEMBERS.

1. Delegates becoming members.

Thomas A. Cheatham, Macon, Ga.
John A. Clark, Hamilton, Canada.
L. Myers Connor, Dallas, Tex.
James D. Croom, Maxton, N. C.
Jos. W. Fowler, Louisville, Ky.
John Fuller Frames, Baltimore, Md.
John M. Harvey, Wilmington, Del.
Louis C. Hogan, Chicago, Ill.
Miner L. H. Leavitt, Boston, Mass.
F. W. Meissner, Jr., La Porte, Ind.
Harry Sharp, Atlanta, Ga.
Henry R. Slack, Jr., La Grange, Ga.
James O. Tigner, Greenville, Ga.

2. Members by proposition and election.

William C. Alpers, Bayonne, N. J.
Albert B. Baltzly, Brooklyn, N. Y.
Louis R. Baridon, Montreal, Quebec.
Wm. A. Beardmore, Jersey City, N. J.
Charles Beck, Baltimore, Md.
John I. Bell, Chicago, Ill.
Samuel H. Bell, Derry Depot, N. H.
Henry P. Berryhill, Connellsville, Pa.
Samuel E. Bishop, Chicago, Ill.
Walter H. Bowron, Caldwell, O.
Andrew G. Briggs, Richmond, Va.
John A. Buckner, Pleasant Hill, Mo.
Lindsay Bunting, Bristol, Tenn.
George F. Carter, Athens, Tenn.
Victor L. Cole, Corning, N. Y.
Anson A. Culver, Momence, Ill.
Theo. G. Davis, Bridgeton, N. J.
Albert De Lorenzi, Dallas, Tex.
William A. Dell, Jacksonville, Fla.
Edward Delouest, Ocala, Fla.
Horace T. Dodge (1889), Leadville, Col.
John Bonar Edie, McKeesport, Pa.
Claud Field, Indianapolis, Ind.
Ardon C. Finley, Rochester, Pa.
Herbert L. Ford, New York, N. Y.
E. C. H. FOUGERA, Brooklyn, N. Y.
C. Stanley French, Philadelphia.
Harry B. French, Philadelphia.
John N. Gayner, Grove City, Minn.
Robert J. Gooding, New Berne, N. C.
Wm. E. Halleck, Washington, D. C.
Susan Hayhurst, Philadelphia.
Geo. G. Heller, East St. Louis, Ill.
Samuel L. Hilton, Washington, D. C.
J. Walter Hodges, Annapolis, Md.
Adolph J. Hoenny, St. Louis, Mo.
John J. Hogan, Birmingham, Conn.
Henry P. Hynson, Baltimore, Md.
Wm. F. Ingram, Norfolk, Va.
George Judisch, Des Moines, Ia.
Clarence P. Kearfott, Martinsville, Va.
Herbert E. Kenney, Littleton, N. H.
Frank G. Kerr, Van Buren, Ark.
George Kieffer, Cleveland, O.
Samuel M. Koles, New York, N. Y.
Sidney B. Leonardi, Tampa, Fla.
Josiah K. Lilly, Indianapolis, Ind.
Walter C. Masi, Norfolk, Va.
John J. McAfee, Mobile, Ala.
Aylmer L. Morgan, Camden, Ark.
William G. Morris, Chicago, Ill.
Wm. S. Nicholson, Broken Bow, Neb.
John Ogden, Philadelphia, Pa.
John E. Parrott, Kinston, N. C.
John E. Patton, Tracy City, Tenn.
Wm. F. Phillips, Norfolk, Va.
Chas. H. Pleasants, New York, N. Y.
Nicholas S. Pursell, Leesburg, Va.
Gustave A. Richter, Philadelphia.
Felix O. Robertson, Searcy, Ark.
Walter S. Rockey, New York City.
Albert M. Roehrig, Stapleton, N. Y.
Henry H. Rusby, New York, N. Y.
Eugene A. Sayre, Glendale, O.
John E. Schaap, Fort Smith, Ark.
Wm. C. Schiller, Baltimore, Md.

Geo. J. F. Schmitt, San Antonio, Tex.
Louis Schurk, St. Louis, Mo.
Richard Schweikhardt, Dallas, Tex.
Charles R. Sherman (1889), Omaha, Neb.
Alvin H. Sippy, St. Louis, Mo.
Clarence P. Smith, Newark, N. J.
Edward S. Smith, Port Henry, N. Y.
Reuben R. Smith, New York, N. Y.
David E. Smithson, Caldwell, Idaho.
DeWitt C. Snyder, Tampa, Fla.
Louis C. Staudt, Aurora, Ill.
Dwight G. Stoughton, Hartford, Conn.
R. H. Stratton, Gordonsville, Va.
James H. Thompson, Boston, Mass.
Chas. W. Tomfohrde, St. Louis, Mo.
G. R. Tucker, Boston, Mass.
Andrew Van Antwerp, Mobile, Ala.
John G. Vogt, St. Louis, Mo.
Harry M. Washburn, Topeka, Kan.
James W. Westcott, Baltimore, Md.
Benj. C. Williams, Wilson, Wis.
Fred. M. Wills, Charlottesville, Va.
Alonzo F. Wood, Jr., New Haven, Conn.
George M. Wood, Bloomfield, N. J.
James P. Wood, New Haven, Conn.
Daniel T. Wooldridge, Boonville, Mo.
Chas. L. Wright, Petersburg, Va.
Theodore H. Wurmb, St. Louis, Mo.

LIST OF MEMBERS AND DELEGATES IN ATTENDANCE AT OLD POINT COMFORT.

Names of delegates indicated by *; delegates not members, *†.

*Alexander, M. W., St. Louis, Mo.
Averill, W. H., Frankfort, Ky.
Baker, T. R., Richmond, Va.
Bayley, A. R., Cambridgeport, Mass.
* Beckwith, E. R., Petersburg, Va.
* Bedford, P. W., New York City.
* Beetem, J. S., Wilmington, Del.
Behrens, P. J., Chicago, Ill.
Bell, J. I., Chicago, Ill.
Benjamin, J. H., Brooklyn, N. Y.
Bocking, E., Wheeling, W. Va.
* Bond, J. B., Little Rock, Ark.
Butler, C. H., Oswego, N. Y.
* Candidus, P. C., Mobile, Ala.
* Canning, Henry, Boston, Mass.
* Cates, W. E., Providence, R. I.
Chapman, I. C., Newburgh, N. Y.
* Cheatham, T. A., Macon, Ga.
* Clark, Jno. A., Hamilton, Ont.
Commings, C. S., Schuylkill Haven, Pa.
* Connor, L. M., Dallas, Tex.
Cook, T. P., New York.
* Cornell, E. A., Williamsport, Pa.
* Craighill, E. A., Lynchburg, Va.
* Croom, J. D., Maxton, N. C.
* Culbreth, D. M. R., Baltimore, Md.
* Curtman, C. O., St. Louis, Mo.
* Cushman, H. C., Pensacola, Fla.
*† Danis, F. R., Morristown, N. J.
Davenport, B. F., Boston, Mass.
Davis, T. G., Bridgeton, N. J.
Dawson, E. S., Syracuse, N. Y.
Dewoody, Wm. L., Pine Bluff, Ark.
* Diehl, C. Lewis, Louisville, Ky.
* Dohme, Chas. E., Baltimore, Md.
* Dohme, Louis, Baltimore, Md.
Doliber, Thos., Boston, Mass.
Duckett, W. G., Washington, D. C.
* Ebert, A. E., Chicago, Ill.
* Eccles, R. G., Brooklyn, N. Y.
Eckford, J. W., Aberdeen, Miss.
* Eliel, Leo, South Bend, Ind.
Emanuel, Louis, Pittsburgh, Pa.
Estes, J. J., Rockland, Mass.
* Fairchild, B. T., New York.
Field, C., Indianapolis, Ind.
* Finlay, A. K., New Orleans, La.
* Fowler, J. W., Louisville, Ky.
* Frames, J. F., Baltimore, Md.
French, C. S., Philadelphia, Pa.
* Galt, E. P., Selma, Ala.
Gilpin, H. B., Baltimore, Md.
Godbold, F. C., New Orleans, La.
* Good, J. M., St. Louis, Mo.
* Goodman, C. F., Omaha, Neb.
Goodwin, E. R., Batesville, Ark.
Gordon, W. J. M., Cincinnati, O.
* Greene, W. R., Providence, R. I.
* Gregory, W. G., Buffalo, N. Y.
Greyer, Julius, Cincinnati, O.
Haber, L. A., Cleveland, O.
* Haigh, De L., St. Louis, Mo.
* Hallberg, C. S., Chicago, Ill.
Halleck, W. E., Washington, D. C.
* Hancock, F. W., New Berne, N. C.
* Hancock, J. H., Baltimore, Md.
* Harvey, J. M., Wilmington, Del.
Hattenhauer, R. C., Peru, Ill.
Hayhurst, Susan, Philadelphia, Pa.
* Hechler, G. L., Cleveland, O.
* Heinitsh, C. A., Lancaster, Pa.
Heller, G. G., East St. Louis, Ill.
* Hogan, L. C., Chicago, Ill.
Holzhauer, Chas., Newark, N. J.
Hopp, L. C., Cleveland, O.
* Hunt, L. W., Macon, Ga.
Hurty, J. N., Indianapolis, Ind.
Ingalls, John, Macon, Ga.
* Jackson, Ed. C., Norfolk, Va.
James, F. L., St. Louis, Mo.

Jenkins, L. L., Boston, Mass.
* Jones, Ed. C., Media, Pa.
Kearfott, C. P., Martinsville, Va.
* Kennedy, G. W., Pottsville, Pa.
Kleinschmidt, A. A., Memphis, Tenn.
* Leavitt, M. L. H., Boston, Mass.
* Lemberger, Jos. L., Lebanon, Pa.
Lilly, J. K., Indianapolis, Ind.
* Lloyd, J. U., Cincinnati, O.
* † Louis, Theo., New York.
* Main, Thos. F., New York.
Maisch, H. C. C., Chicago, Ill.
Maisch, J. M., Philadelphia, Pa.
Manning, J. H., Pittsfield, Mass.
Markoe, G. F. H., Boston, Mass.
* Massey, W. M., New York.
* McIntyre, Wm., Philadelphia, Pa.
* Meissner, F. W., Jr., La Porte, Ind.
Mennen, Gerhard, Newark, N. J.
* Milburn, J. A., Washington, D. C.
Nattans, Arthur, Washington D. C.
Newman, Geo. A., Louisville, Ky.
Ogden, John, Philadelphia, Pa.
* Oldberg, Oscar, Chicago, Ill.
Osmun, Chas. A., New York.
Parrott, J. E., Kinston, N. C.
* Patch, E. L., Boston, Mass.
Pattison, C. H., Chicago, Ill.
Patton, Jno. F., York, Pa.
Pettengill, E. T., Washington, D. C.
Peyton, R. D., Louisville, Ky.
Pleasants, Chas. H., New York.
Plummer, Ed., New York.
Post, E., Philadelphia, Pa.
Price, Chas. H., Salem, Mass.
Pursell, N. S., Leesburg, Va.
Quakinbush, B. F., New York.
* Ramsperger, G., New York.
* Rapelye, C. A., Hartford, Conn.
Redsecker, J. H., Lebanon, Pa.
* Remington, J. P., Philadelphia.
* Rice, Chas., New York.
Riethmann, J. J., Denver, Col.
Robinson, E. A., Lowell, Mass.
Roehrig, A. M., New York.
* Rogers, Wiley, Louisville, Ky.
Rusby, H. H., New York.
Rust, Wm., New Brunswick, N. J.
* Sayre, L. E., Lawrence, Kan.
* Schmid, Henry, New York.
Schmidt, F. M., Chicago, Ill.
Schoettlin, A. J., Louisville, Ky.
Schueller, F. W., Columbus, O.
*† Schuh, Paul G., Cairo, Ill.
Seabury, Geo. J., New York.
* Sharp, Harry, Atlanta, Ga.
Shaw, R. J., Plainfield, N. J.
* Sheppard, S. A. D., Boston, Mass.
* Sherer, Andrew, Chicago, Ill.
Shinn, Jas. T., Philadelphia.
* Simmon, Karl, St. Paul, Minn.
Simms, G. G. C., Washington.
* Simon, Wm., Baltimore, Md.
* Simpson, Wm., Raleigh, N. C.
* Slack, H. R., Jr., La Grange, Ga.
Smith, Clarence P., Newark, N. J.
* Stahlhuth, E. H. W., Columbus, Ind.
Staudt, L. C., Aurora, Ill.
Stein, J. H.; Reading, Pa.
* Stevens, A. B., Ann Arbor, Mich.
Stratton, R. H., Gordonsville, Va.
Summers, G. H., Philadelphia.
Taylor, A. B., Philadelphia, Pa.
* Thompson, W. S., Washington, D. C.
Tiernan, F. M., Roselle, N. J.
* Tigner, J. O., Greenville, Ga.
* Trimble, H., Philadelphia.
* Tsheppe, A., New York.
* Upson, Rosa, Marshalltown, Ia.
Vaughan, P. W., Durham, N. C.
Voss, G. W., Cleveland, O.
Walch, R. H., Philadelphia.
* Walton, J. R., Washington, D. C.
* Watson, S. P., Jacksonville, Fla.
* † Wheeler, C. G., Chicago, Ill.
* Whelpley, H. M., St. Louis, Mo.
Whiting, F. T., Gt. Barrington, Mass.
* Whitney, H. M., Lawrence, Mass.
* Wilcox, F., Waterbury, Conn.
Williams, D. B., Worcester, Mass.
Williams, J. K., Hartford, Conn.
Williams, S. W., East Orange, N. J.
Winter, Jonas, Hagerstown, Md.
Wooldridge, D. T., Boonville, Mo.
Wright, C. L., Petersburg, Va.
Zoeller, E. V., Tarboro, N. C.

LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE THIRTY-EIGHTH ANNUAL MEETING, WITH THE ADDRESSES OF THEIR PRESIDENTS AND SECRETARIES.

COLLEGES OF PHARMACY.

Colleges.	*Presidents.*	*Secretaries.*
Buffalo	——	John R. Gray.
Chicago	Wm. K. Forsyth	Wm. F. Dunham.
Illinois (Chicago)	D. R. Dyche	T. H. Patterson.
Louisville	R. J. Snyder	Fred. C. Miller.
Maryland (Baltimore)	Wm. S. Thompson	John W. Geiger.
Massachusetts (Boston)	S. A. D. Sheppard	C. C. Williams.
National (Washington)	Samuel Waggaman	H. E. Kalusowski.
New York	S. W. Fairchild	J. N. Hegeman.
Ontario	J. A. Clark, Hamilton	I. T. Lewis, Toronto.
Philadelphia	Chas. Bullock	Wm. B. Thompson.
St. Louis	F. W. Sennewald	John C. Falk.

STATE PHARMACEUTICAL ASSOCIATIONS.

	Presidents.	*Secretaries.*
Alabama	Wm. F. Punch, Mobile	P. C. Candidus, Mobile.
Arkansas	W. W. Kerr, Batesville	J. W. Beidelman, Little Rock.
Connecticut	Emil A. Gessner, New Haven	Frederic Wilcox, Waterbury.
Delaware	H. R. Bringhurst, Wilmington	John M. Harvey, Wilmington.
Florida	W. A. Rawls, Tallahassee	S. P. Watson, Jacksonville.
Georgia	John W. Goodwyn, Macon	H. R. Slack, Jr., La Grange.
Illinois	A. A. Culver, Momence	C. S. Hallberg, Chicago.
Indiana	John N. Hurty, Indianapolis	Jos. R. Perry, Indianapolis.
Iowa	W. H. Torbert, Dubuque	Rosa Upson, Marshalltown.
Kansas	Chas. D. Barnes, Abilene	John T. Moore, Lawrence.
Kentucky	J. J. Brooks, Richmond	J. W. Gayle, Frankfort.
Louisiana	M. F. Breslin, New Orleans	L. F. Chalin, New Orleans.
Maryland	M. L. Byers, Hagerstown	Jno. W. Geiger, Baltimore.
Massachusetts	E. C. Marshall, Charlestown	J. W. Colcord, Boston.
Michigan	Frank Inglis, Detroit	H. J. Brown, Ann Arbor.
Minnesota	E. F. Allen, Minneapolis	Karl Simmon, St. Paul.
Missouri	William E. Bard, Sedalia	G. H. C. Klie, St. Louis.
Nebraska	Chas. J. Daubach, Lincoln	Julia M. Crissey, Omaha.
New Hampshire	Geo. F. Underhill, Concord	C. B. Spofford, Claremont.

New Jersey	H. P. Thorn, Medford	Chas. F. Dare, Bridgeton.
New York	W. G. Gregory, Buffalo	Clay W. Holmes, Elmira.
North Carolina	E. V. Zoeller, Tarboro	F. W. Hancock, New Berne.
Ohio	F. M. Heath, White House	L. C. Hopp, Cleveland.
Pennsylvania	Jacob H. Stein, Reading	Jacob A. Miller, Harrisburg.
Rhode Island	F. A. Jackson, Woonsocket	W. E. Cates, Providence.
South Dakota	R. A. Mills, Aberdeen	I. A. Keith, Lake Preston.
Texas	C. B. Morrison	L. M. Connor, Dallas.
Virginia	R. H. Stratton, Gordonsville	C. B. Fleet, Lynchburg.
Wisconsin	R. Saurhering, Mayville	E. B. Heimstreet, Janesville.

LOCAL ASSOCIATIONS.

	Presidents.	*Secretaries.*
German Apothecaries of New York City	G. Pfingsten	W. Mettenheimer
Norfolk and Portsmouth	——————	J. W. Thomas, Jr.
St. Louis Microscopists	J. C. Falk, St. Louis	Frank Davis, Belleville, Ill.

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

	Presidents.	*Secretaries.*
Buffalo	——————	S. Hobart Dorn.
Chicago	R. Voge	F. A. Rometch.
Cincinnati	E. J. Kaefer	W. Simonson.
Maryland (Baltimore)	——————	John H. Hancock.
National (Washington)	S. L. Hilton	S. T. Grimes.
New York	C. W. Brunner, Brooklyn.	W. H. Madison, Brooklyn.
Philadelphia	Wm. N. Stein	Wm. E. Krewson.
St. Louis	H. M. Whelpley	J. C. Falk.

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

P. Van Schaak, Chicago, President. . . . . A. B. Merriam, Minneapolis, Secretary.

LIST OF PUBLICATIONS RECEIVED

FOR THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Societies and Editors are respectfully requested to forward all Publications intended for the American Pharmaceutical Association to the Permanent Secretary. European exchanges, if not sent by mail, will reach us through the Smithsonian Institution at Washington.

JOHN M. MAISCH,
143 North Tenth Street, Philadelphia.

☞ Proceedings of *State Pharmaceutical Associations* are to be sent to the REPORTER ON THE PROGRESS OF PHARMACY, C. LEWIS DIEHL, Louisville, Ky., to be used for his annual report.

American Druggist, New York, 1890.
American Journal of the Medical Sciences, Philadelphia, 1890.
American Journal of Pharmacy, Philadelphia, 1890.
American Pharmacist, Detroit, 1890.
Anzeiger der K. K. Gesellschaft der Wissenschaften, Wien, 1890.
Bolletino delle Pubblicazioni Italiane ricevute per diritto di stampa, 1890.
Calendar of the Pharmaceutical Society of Great Britain, 1890.
Calendar of the Pharmaceutical Society of Ireland, 1890.
Deutsch-Amerikanische Apotheker-Zeitung, New York, 1890.
Nachrichten d. K. Gesellschaft der Wissenschaften zu Göttingen, 1889.
Pharmaceutical Journal and Transactions, London, 1890.
Pharmaceutical Record, New York, 1890.
Pharmaceutische Rundschau, New York, 1890.
Proceedings of the American Academy of Arts and Sciences, Boston, xxiii, 2. xxiv.
Proceedings of the Philosophical Society of Glasgow, 1888–'89, vol. xx.
Report (3d) of the Bureau of Industrial and Labor Statistics for the State of Maine, 1889.
Report of the President of Yale University for 1889.
Report (103d) of the Regents of the University of the State of New York, 1889.
Report of the State Librarian of New Jersey, 1889.
Report (41st) of the Trustees of the Astor Library, New York, 1889.
Report of the Trustees of the New York State Library, 1889.
Sitzungsberichte der K. B. Akademie der Wissenschaften, 1888, iii; 1889, i, ii.
The Canadian Pharmaceutical Journal, Toronto, 1890.
The Chemist and Druggist, London, 1890.
The Druggists' Circular, New York, 1890.
The National Druggist, St. Louis, 1890.
The Western Druggist, Chicago, 1890.
Transactions of the College of Physicians, Philadelphia, 3d Series, xi.
Transactions of the Medical and Chirurgical Faculty of the State of Maryland, Baltimore, 1890.
Transactions of the Michigan State Medical Society, 1890.
Yearbook of Pharmacy and Transactions of the British Pharmaceutical Conference.
Zeitschrift des Allgemeinen Oesterreichischen Apotheker–Vereines, Wien, 1890.

LIST OF SOCIETIES, LIBRARIES, JOURNALS, AND INDIVIDUALS,

TO WHOM COMPLIMENTARY COPIES OF THE PROCEEDINGS OF THIS ASSOCIATION ARE FORWARDED.

The State Libraries of all the States of the Union except Connecticut. (At the request of the State Librarian of Connecticut, a copy of the Proceedings is sent to Trinity College, Hartford, Conn.)

Alabama.—State Library of Alabama, Montgomery.
Arkansas.—State Library of Arkansas, Little Rock.
California.—State Library of California, Sacramento.
Colorado.—California College of Pharmacy, 113 Fulton street, San Francisco.
" State Library of Colorado, Denver.
Connecticut.—Medical Journal and Library Association, Hartford.
" Trinity College, Hartford.
" Silas Bronson Library, Waterbury.
" Yale College, New Haven.
Delaware.—State Library of Delaware, Dover.
District of Columbia.—National College of Pharmacy, 820 I street, N. W., Washington.
" Bureau of Education, Washington.
" Congressional Library, Washington.
" Department of Agriculture, Washington.
" Library of the American Medical Association, Washington.
" Smithsonian Institution, Washington.
" Surgeon-General United States Army, Washington.
" Surgeon-General United States Marine Hospital Service, Washington.
" Surgeon-General United States Navy, Washington.
" United States Patent Office, Washington.
Florida.—State Library of Florida, Tallahassee.
Georgia.—State Library of Georgia, Atlanta.
Illinois.—Chicago College of Pharmacy, 465 State street, Chicago.
" Illinois College of Pharmacy, 40 Dearborn street, Chicago.
" The Western Druggist, 69 Dearborn street, Chicago.
" State Library of Illinois, Springfield.
Indiana.—Purdue University, Lafayette.
" State Library of Indiana, Indianapolis.
Iowa.—State Library of Iowa, Des Moines.
Kansas.—Kansas State University, Lawrence.
" State Library of Kansas, Topeka.
Kentucky.—Louisville College of Pharmacy, First and Chestnut streets, Louisville.
" State Library of Kentucky, Frankfort.
Louisiana.—State Library of Louisiana, Baton Rouge.

Maine.—Maine Insane Asylum, Augusta.
" Bowdoin College, Brunswick.
" State Library of Maine, Augusta.
Maryland.—Maryland College of Pharmacy, Aisquith street, Baltimore.
" Maryland Academy of Sciences, Baltimore.
" Medical and Chirurgical Faculty of Maryland, Dr. G. L. Taneyhill, Secretary, Baltimore.
" University of Maryland, Baltimore.
" State Library of Maryland, Annapolis.
Massachusetts.—Amherst College, Amherst.
" American Academy of Arts and Sciences, Boston.
" Boston Athenæum, Boston.
" City Library, Boston.
" City Hospital, Boston.
" Harvard University, Cambridge.
" Massachusetts College of Pharmacy, Botolph & Garrison street, Boston.
" Massachusetts General Hospital, Boston.
" Medical Library Association, Boston.
" State Library of Massachusetts, Boston.
Michigan.—Michigan State Medical Society, Dr. G. Duffield, Detroit.
" American Pharmacist, Detroit.
" The Pharmaceutical Era, Detroit.
" University of Michigan, Ann Arbor.
" State Library of Michigan, Lansing.
Minnesota.—National Wholesale Druggists' Association, A. B. Merriam, Secretary, Minneapolis.
" State Library of Minnesota, St. Paul.
Mississippi.—State Library of Mississippi, Jackson.
Missouri.—Academy of Science of St. Louis, St. Louis.
" National Druggist, 618 N. 2d street, St. Louis.
" The Druggist, St. Louis.
" St. Louis College of Pharmacy, St. Louis.
" St. Louis Mercantile Library, St. Louis.
" St. Louis Public School Library, St. Louis.
" State Library of Missouri, Jefferson City.
Montana.—State Library of Montana, Helena.
Nebraska.—State Library of Nebraska, Lincoln.
Nevada.—State Library of Nevada, Carson City.
New Hampshire.—Dartmouth College, Hanover.
" State Library of New Hampshire, Concord.
New Jersey.—New Jersey State Lunatic Asylum, Trenton.
" State Library of New Jersey, Trenton.
New York.—Albany College of Pharmacy, Eagle street, Albany.
" American Druggist, New York.
" Astor Library, New York.
" College of Pharmacy of the City of New York, 211 E. 23d street, New York.
" Deutsch-Amerikanische Apotheker Zeitung, New York.
" Druggists' Circular, 72 William street, New York.
" Literary and Scientific Society of German Apothecaries, 211 E. 23d street, New York.
" Mercantile Library, New York.
" New York Academy of Medicine, 12 West 31st Street, New York.

New York.—Pharmaceutical Record, 66 Duane street, New York.
“ Pharmaceutische Rundschau, 183 Broadway, New York.
“ Long Island Historical Society, Brooklyn.
“ State Library of New York, Albany.
North Carolina.—State Library of North Carolina, Raleigh.
North Dakota.—State Library of North Dakota, Bismarck.
Ohio.—Cincinnati Academy of Medicine, Cincinnati.
“ Cincinnati College of Pharmacy, Cincinnati.
“ Mussey Medical Library, Cincinnati.
“ Cincinnati Hospital Library, Cincinnati.
“ Longview Asylum, Carthage, Hamilton county.
“ State Library of Ohio, Columbus.
Oregon.—State Library of Oregon, Salem.
Pennsylvania.—Academy of Natural Sciences, 19th & Race streets, Philadelphia.
“ American Journal of Medical Sciences, 706 Sansom street, Philadelphia.
“ American Journal of Pharmacy, 143 N. 10th street, Philadelphia.
“ American Philosophical Society, 5th & Chestnut street, Philadelphia.
“ College of Physicians, 13th & Sansom street, Philadelphia.
“ Franklin Institute, S. 7th street, Philadelphia.
“ Mercantile Library, S. 10th street, Philadelphia.
“ Pennsylvania Hospital, 3rd & Pine streets, Philadelphia.
“ Philadelphia College of Pharmacy, 145 N. 10th street, Philadelphia.
“ Philadelphia Library, Locust & Juniper streets, Philadelphia.
“ Pittsburgh College of Pharmacy, Pittsburgh.
“ State Library of Pennsylvania, Harrisburg.
Rhode Island.—State Library of Rhode Island, Providence.
South Carolina.—South Carolina Medical Association, Dr. J. L. Dawson, Secretary, Charleston.
“ State Library of South Carolina, Columbia.
South Dakota.—State Library of South Dakota, Pierre.
Tennessee.—State Library of Tennessee, Nashville.
Texas.—State Library of Texas, Austin.
Vermont.—University of Vermont, Burlington.
“ State Library of Vermont, Montpelier.
Virginia.—State Library of Virginia, Richmond.
Washington.—State Library of Washington, Olympia.
West Virginia.—State Library of West Virginia, Charleston.
Wisconsin.—University of Wisconsin, Madison.
“ State Library of Wisconsin, Madison.
Canada.—Halifax Pharmaceutical Society, Nova Scotia.
“ Ontario College of Pharmacy, Toronto.
“ University of Toronto, Toronto.
“ Pharmaceutical Association of the Province of Quebec, E. Muir, Secretary, 595 Lagauchetiere street, Montreal.
Mexico.—Escuela de Farmacia, Mexico.
Argentine Republic.—Sociedad de Farmacia Argentina, Buenos Ayres.
Austria.—Zeitschrift d. Allg. Oesterreichischen Apotheker-Vereines, Wien.
“ K. K. Gesellschaft der Aerzte, Wien.
“ K. Akademie der Wissenschaften, Wien.
Belgium.—Académie Royale de Médecine de Belgique, Bruxelles.
“ Société de Pharmacie Royale de Bruxelles.
“ Société Royale des Sciences Médicales et Naturelles, Bruxelles.

Belgium.—Société de Pharmacie d'Anvers.
Denmark.—Archiv for Pharmacie, S. M. Trier, Kjobenhavn.
" Denmark's Apotheker Forening, Gust. Lotze, President, Odense.
France.—Bibliothèque de l' École supérieure de Pharmacie, Paris.
Germany.—Archiv der Pharmacie, Waisenhausbuchhandlung, Halle.
" K. Akademie der Wissenschaften, Göttingen.
" K. Bayer. Akademie der Wissenschaften, München.
" K. Bibliothek der Universität Strassburg.
" Pharmaceutisches Institut, Universität Erlangen.
Great Britain.—British Pharmaceutical Conference, 17 Bloomsbury Square, London.
" Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London.
" Pharmaceutical Journal and Transactions, 17 Bloomsbury Square, London.
" Chemical News, Boy Court, Ludgate Hill, London, E. C.
" Chemist and Druggist, 44 Cannon Street, London.
" British Museum, London.
" Association of Chemists and Druggists, Wolverhampton.
" Coventry and Warwickshire Pharmaceutical Association, Coventry.
" Liverpool Chemists' Association, Liverpool.
" Pharmaceutical Society at Edinburgh, 36 York Place.
" Pharmaceutical Society of Ireland, Dublin.
" Philosophical Society, Glasgow.
Italy.—R. Biblioteca Nazionale, Centrate, Firenze.
" Archivio di Farmazia, Roma.
Netherlands.—Nederlandsche Maatschappij ter bevordering der Pharmacie, Jacobus Polak, Secretary, Amsterdam.
Norway.—Kongelige Norske Universitet i Christiani.
Russia.—Pharmaceutische Gesellschaft in St. Petersburg, St. Petersburg.
" Pharmaceutisches Institut, Dorpat, Russia.
Sweden.—Pharmaceutical Institution, Stockholm, Sweden.
Switzerland.—Schweizerische Wochenschrift für Pharmacie, A. Klunge, Aubonne.
Australia.—Pharmaceutical Society of Victoria, Melbourne.
" Australasian Journal of Pharmacy, Melbourne.
" Pharmaceutical Society of New South Wales, Sydney.
" Pharmaceutical Society of New Zealand, Auckland.

GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

SECTIONS APPLICABLE TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

CLASS 3, SOCIETIES, BENEVOLENT, EDUCATIONAL, ETC.

SEC. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgment of deeds in the District, and file in the Office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and objects of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

SEC. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same, and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

SEC. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business, and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

SEC. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed: and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

SEC. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows; whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that purpose, the proceedings of which meeting shall be duly entered in the records of the corporation; said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

Approved 5 May, 1870, c. 80, v. 16, pp. 98–116—Revised Statutes of the United States relating to the District of Columbia.

CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Whereas, We, the undersigned, desire to form an association having for its object to unite the eduated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

First, The corporate name of the association is the American Pharmaceutical Association.

Second, This association shall continue until dissolved by the action of its members, or by the operation of law.

Third, The objects and business of said association are as follows:

a. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

b. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

c. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

d. To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

e. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

f. To uphold standards of authority in the education, theory and practice of Pharmacy.

g. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

Fourth, The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1887.

Signed:

JOHN U. LLOYD,
ALEX. K. FINLAY,
SAMUEL A. D. SHEPPARD,
JAMES VERNOR,
WILLIAM H. ROGERS,
ALBERT E. EBERT,
GEORGE W. KENNEDY,
JAMES M. GOOD,

MAURICE W. ALEXANDER,
KARL SIMMON,
JOHN M. MAISCH,
C. LEWIS DIEHL,
WM. SAUNDERS,
PHILIP C. CANDIDUS,
ALBERT H. HOLLISTER,
LEWIS C. HOPP,
WILLIAM DUPONT,

Members of the Council,

And

JOHN A. MILBURN,
E. B. BURY,
W. S. THOMPSON,
CHARLES CHRISTIANI,
A. J. SCHAFHIRT,
O. H. COUMBE,
GEO. B. LOCKHART,
T. C. MURRAY,
JOSEPH R. WALTON,

G. G. C. SIMMS,
Z. W. CROMWELL,
JOHN R. MAJOR,
W. G. DUCKETT,
GEO. W. BOYD,
HENRY A. JOHNSTON,
W. C. MILBURN,
ARTHUR NATTANS,
THOMAS M. WEHRLY,

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1888, at 1:05 P. M., and recorded in Liber No. 4, fol. 302, Acts of Incorporation, District of Columbia, and examined.

Signed: JAS. M. TROTTER, *Recorder.*

SEAL:
Office of Recorder of Deeds,
District of Columbia,
Washingtou, D. C.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration.

2. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all meetings of the Association, except those of the special Sections, as hereinafter provided. In his absence or inability, one of the Vice-Presidents, or in the absence of all, a President *pro tempore* shall perform the duties of President.

ARTICLE II. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore.*

ARTICLE III. In meetings, the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports, and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all ballotings, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in cases of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, unless provided for in the By-Laws, or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the Permanent Secretary.

Article I. The Permanent Secretary shall be elected to hold office permanently during the pleasure of the Association. He shall receive from the Treasurer an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

Article II. He shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Council.

Article III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act; and shall notify every member of the time and place of each annual meeting.

CHAPTER III.

Of the Local Secretary.

Article I. The Local Secretary shall be elected annually, near the close of the annual meeting, and shall reside at or near the place where the next annual meeting of the Association is to be held.

Article II. He shall assist the Permanent Secretary in his duties; shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

Article III. An exhibition of objects interesting to pharmacists shall be held each year, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER IV.

Of the Treasurer.

Article I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

Article II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

Article III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annnal contributions for three years.

Article IV. He shall present a statement of his accounts at each annual meeting of the Council, that they may be audited; he shall receive an annual salary of $600, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $10,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or Trust Company acceptable to the Council.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual sum of $750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions; together with such statistical, biographical and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which shall be empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by a special vote of the Council, be invited to speak on any subject under discussion.

ARTICLE II. The Council shall consist of seventeen members, nine of whom shall be elected by ballot by the Association in the following manner: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years. No elected member of the Council, after having served one term, shall be eligible for re-election to the Council to serve the next succeeding term.

ARTICLE III. The President, Vice-Presidents, Secretary, Local Secretary, Treasurer, and Reporter on the Progress of Pharmacy of the Association, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, to be elected by ballot annually by the Council. The Secretary may or may not be a member of the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings of the Association, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as they may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

CHAPTER VII.

Of Committees.

ARTICLE I. There shall be five standing committees: A Committee on Commercial Interests, and on the Revision of the U. S. Pharmacopœia, each to consist of five members; a Committee on Scientific Papers, a Committee on Prize Essays and a Committee on Pharmaceutical Legislation and Education, each to consist of three members.

ARTICLE II. The Committee on Commercial Interests shall be appointed by the Section on Commercial Interests. They shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. They shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association they shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be appointed by the Section on Scientific Papers. They shall arrange the business of the Section, and shall report, near the close of each annual meeting, a proper number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same, with a synopsis of its contents, to the Committee on Scientific Papers previous to the first session.

ARTICLE V. It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Scientific Papers before the first annual session of the Association.

ARTICLE VI. The Committee on Prize Essays, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the Committee, with such comments upon the successful essay only as they may deem proper, may be published in the Journals of Pharmacy.

ARTICLE VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. They shall arrange the business of the Section in advance of its meetings, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to them by the Section.

ARTICLE VIII. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall be their duty to collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which officinal and non-officinal remedies are used in legitimate practice, and shall endeavor to ascertain the general wishes and feelings of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia.

CHAPTER VIII.

Of Membership.

ARTICLE I. Every Pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry, and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, are willing to subscribe to them, are eligible to membership.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and if the Association shall by vote invite said person to become a member, his membership shall be completed by his signing the Constitution and By-laws, and paying the annual contribution for the current year.

ARTICLE III. Every member shall pay in advance to the Treasury the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years.*

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials should be sent to the Permanent Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer.

ARTICLE VII. Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-laws.

ARTICLE VIII. Resignations of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE IX. Any member may be expelled for improper conduct, or the violation of the Constitution, By-laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

ARTICLE X. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER IX.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows: 1. Scientific Papers; 2. Commercial Interests; 3. Pharmaceutical Legislation and Education.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annnal meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read its minutes and act on the report of Council on membership.

ARTICLE V. At the third and fourth sessions the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fifth, sixth and seventh sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VII. At the eighth session the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VIII. A Chairman and Secretary shall be elected by ballot by each Section to serve at the special meetings of said Section. And the minutes of each meeting, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the Permanent Secretary for publication or safe-keeping.

ARTICLE IX. The Chairman of each Section shall preside at each of its meetings, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the next annual meeting.

ARTICLE X. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XI. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the Permanent Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. The Council shall read the names of the candidates for membership, as provided in Section 2, Article VIII., Chapter VI.

Section 6. Reports of Committees shall be presented, read by their titles, the synopsis or in full, and laid on the table for future consideration.

Section 7. The President shall call the roll of States represented, requesting each State in turn to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing year; in addition to which he shall appoint five members to act with the Committee.

Section 8. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, their acts shall be revised, so as to be acceptable to the Association.

Section 9. Incidental business may be called up.

ARTICLE XII. The order of business at the second session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the officers nominated shall be balloted for.

Section 4. The Council shall present names recommended for membership.

Section 5. Reports of Standing Committees shall be read.

Section 6. Reports of Special Committees shall be read.

ARTICLE XIII. The order of business for the meetings of the Sections shall be determined by each Section for itself.

ARTICLE XIV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XV. At the last session of the Association the newly-elected officers of the Association shall take their respective places.

CHAPTER X.

Of Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

Article III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

Article IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

Article I. In all such points of order as are not noticed in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

Article II. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

Article III. No one or more of these By-Laws shall be suspended.

SECTION ON SCIENTIFIC PAPERS.

ORDER OF BUSINESS.

FIRST SESSION OF THE SECTION (Fifth of the Association).

1st. The Chairman and Secretary assume their respective places.

2d. Reading of the Chairman's address.

3d. Reports of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.

4th. Nominations (but not elections at this sitting) for the new Committee on Scientific Papers. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.

5th. Reading of Papers and discussions on the subjects brought up.

6th. Adjournment.

SECOND SESSION OF THE SECTION (Sixth of the Association).

1st. Reading of Minutes of the previous session.
2d. Election of New Committee on Scientific Papers.
3d. Reports of Committees—Incidental Business.
4th. Reading of Papers.
5th. Adjournment.

THIRD SESSION OF THE SECTION (Seventh of the Association).

1st. Reading of Minutes of the previous session.
2d. Reading of Papers.
3d. Installation of New Officers.
4th. Reports of Committees.
5th. New Business.
6th. Reading of Minutes.
7th. Final Adjournment.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

Article I. The Officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, who shall be elected by ballot by the Council, to serve one year.

Article II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

Article I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

Article II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

Article I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of $50.

Article II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

Article III. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting.

CHAPTER IV.

Committee on Membership.

Article I. The Committee on Membership shall consist of five members of the Council, to be elected annually by ballot. The Permanent Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect their chairman immediately after their election by the Council.

Article II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present the list of applicants for membership who have complied with the requirements of the By-Laws of the Association, to the Council.

Article III. They shall furnish appropriate obituary notices of deceased members for publication in the Proceedings.

Article IV. The Secretary of the Committee shall receive an annual salary of $150.

CHAPTER V.

Of Committee on Publication.

Article I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council, who shall elect their chairman immediately after their own election by the Council.

Article II. The Committee on Publication shall have charge of the publication and distribution of the Proceedings.

CHAPTER VI.

Of Committee on Finance.

Article I. The Committee on Finance shall consist of three members. They shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

Article I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the Permanent Secretary. They shall annually, at the meetings, and after due notice through the Pharmaceutical journals, receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

Article II. After considering these applications, the Committee shall, at as early a date as possible, report to the Council, recommending such grants from the available funds as they may deem proper.

Article III. The Council shall decide upon these recommendations, and shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

Of Meetings.

ARTICLE I. The Council shall meet previous to the assembling of the Association and at such other times as they may adjourn to, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special meeting shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and Secretary.
2. Election of the Standing Committees of Council, as follows:
   a. Committee on Membership, consisting of five members of the Council, the Permanent Secretary, and Treasurer.
   b. Committee on Finance, three members.
   c. Committee on Publication, five members.
   d. Committee on Centennial Fund, three members.
3. Unfinished and deferred business from the meeting of the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session shall be read and approved.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at the next session of the Council, when, upon receiving the votes of three-fourths of the members present, it shall become a part of these By-Laws.

FORM OF PROPOSITIONS FOR MEMBERSHIP.

THE undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VIII. Article I. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES.	ADDRESS.

FORM FOR COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VIII. ARTICLE II. OF THE BY-LAWS.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full, --

Date, --

Address, --

GENERAL RULES ON FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Chairman of the Council shall be the custodian of the bonds and saving-bank-books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

Sixth, There shall be annually appointed, by the Council, an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, the chairman to be a member of the Finance Committee.

Seventh, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

Eighth, The Treasurer having thus balanced his books and made out his report, shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council shall forward to the Chairman of the Auditing Committee at the same time and place, the bonds, saving-bank books, and accounts of the same that may be in his hands.

Ninth, Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, savings bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Auditing Committee.

Tenth, There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc.,received by them; and, previous to the 1st day of August following, to make a report thereon, in writing, to the Chairman of the Council.

Eleventh, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

ROLL OF MEMBERS.

HONORARY MEMBERS.

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. De Meyer, *Brussels*, 1868.
Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.
Dr. Robert Bentley, *London*, 1872.
Henry B. Brady, *Newcastle-on-Tyne*, 1871.
Michael Carteighe, *London*, 1882.
Thomas Greenish, *London*, 1882.
Joseph Ince, *London*, 1882.
Dr. J. Redwood, *London*, 1871.
Richard Reynolds, *Leeds*, 1882.
George W. Sanford, *London*, 1882.
Geo. F. Schacht, *Clifton*, *Bristol*, 1882.

FRANCE.

Dr. G. Planchon, *Paris*, 1877.
Dr. J. Léon Soubeiran, *Montpellier*, 1871.

GERMANY.

Dr. Christian Brunnengraeber, *Rostock*, 1882.
Dr. F. A. Flückiger, *Strassburg*, 1868.
Dr. Hermann Hager, *Pulvermühle bei Fürstenberg*, 1868.
Dr. Carl Schacht, *Berlin*, 1882.

NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.
J. von Martenson, *St. Petersburg*, 1882.

SWITZERLAND.

Dr. Edward Schaer, *Zurich*, 1877.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.

(The names of Life Members in SMALL CAPITALS. Names of Life Members under the old Constitution in *italics.)*

UNITED STATES OF AMERICA.

ALABAMA.

Birmingham.

Norton, Edward Benjamin 1888
Stollenwerck, Alphonse Leander . . . 1887

Mobile.

Brown, Albert Edward 1887
Candidus, Philip Charles 1857
Hawkins, Joseph Thomas 1878
McAfee, John James 1890
Mohr, Charles. 1871
Punch, William Francis. 1874
Tucker, Mosely Fleming 1888
Van Antwerp, Andrew 1890
Van Antwerp, Garet 1880

Montgomery.

Knabe, Gustavus Alexander 1876

Selma.

Galt, Edward Pegram 1883

ARIZONA.

Phœnix, Maricopa Co.

Eschman, Clemens Louis 1889

ARKANSAS.

Batesville, Independence Co.

Goodwin, Eugene Richard 1887
Kerr, William Whitman 1887

Camden.

Morgan, Aylmer Lee. 1890

Fort Grant.

Grant, Albert Warren 1889

Fort Smith.

Schaap, John E 1890

Little Rock.

Bond, John Barnitz 1883
Bond, Sterling Price 1887
Gibson, James Edwin 1887
Jungkind, John August 1887

Pine Bluff.

Dewoody, William Lawrence 1887

Searcy.

Robertson, Felix Otey 1890

Van Buren.

Kerr, Frank Gault 1890

CALIFORNIA.

Alameda, Alameda Co.

Elbe, Constantine Berthold 1877

Angel's Camp, Calaveras Co.

Scribner, John Cairnes 1889

Bakersfield, Kern Co.

Drury, John Stimson 1889

Centreville, Alameda Co.

Lernhart, August 1889

Eureka, Humboldt Bay.

Powell, Robert Baldwin 1880

Los Angeles.

Buehler, John Jacob 1889
Rives, Edward B 1889

Marysville, Yuba Co.

Flint, John Henry 1889

Monterey.

Hilby, Francis Martin 1886

Oakland.

Clapp, George Henry	1889
Flint, George Benjamin	1889
Kirkland, Derwentwater	1889
Maclise, James	1889
Melvin, Samuel Houston	1889
Smith, William Clay	1889

Oroville, Butte Co.

Ekman, Nils Adolf	1889
Green, Robert Moore	1889

Pasadena.

Bley, Alphonso Albert Willetts	1889

Sacramento.

Helke, William Ludwig	1889
Ray, Frederick Edwards	1889

San Francisco.

Bacon, Gaston Ernest	1887
Bayly, Charles Alfred	1889
Beckett, Frederick Arthur	1885
Brackett, Aurick Smith	1868
Calvert, John	1870
Dawson, John Henry	1882
Devine, John	1887
Hastings, Benjamin	1889
Hulting, Frederick Benjamin	1889
Hunt, Denis Denvin	1889
Joy, Edwin Wolcott	1882
Keil, Frederick Charles Christian	1889
Lengfeld, Abraham Louis	1879
Martin, Samuel Robert	1889
Moffit, Thomas Sabatier	1861
Runyon, Edward Wheelock	1875
Schmidt, Valentine	1887
Searby, William Martin	1882
Steele, Henry	1859
Steele, James Gurden	1859
Welch, Willard Choate, Jr.	1889
Wenzell, William Theodore	1870
White, Richard Edward	1889

Santa Barbara, Santa Barbara Co.

Gutierrez, Antonio Gabriel	1889

Santa Clara.

Oberdeener, Samuel	1889

Santa Cruz.

Fay, Hamilton	1889
Rumsey, Samuel Louis	1876
Tanner, John George	1889

Santa Monica, Los Angeles Co.

Miller, William	1889

Selma, Fresno Co.

McCartney, Winfield Scott	1889

Stockton.

Holden, Isaac Dana	1889

Vacaville.

Miller, James Monroe	1889

Vallejo, Solano Co.

Topley, James	1869

Yreka

Bradley, James Walker	1889

COLORADO.

Central City.

Best, John	1866

Denver.

Beitenman, William Wallace	1888
Chandler, Isaac Eugene	1888
Ford, Charles Mangan	1887
Kochan, John	1888
Kostitch, Stephen Theodore	1889
Lord, Frank Jotham	1889
Price, Charles Asbury	1889
Scholtz, Edmund Louis	1881
Steinhauer, Frederick	1881
Thurber, Almon Russel	1880
Walbrach, Arthur	1881

Glenwood Springs, Garfield Co.

Ewing, Frederic Charles	1889

Leadville.

Dodge, Horace Tennent	1889

Lyons.

Crona, Sixtus Ewald Seine	1885

Sopris.

Davison, John Thorne	1888

COLUMBIA, DISTRICT OF.

Washington.

Boyd, George Washington	1883
Christiani, Charles	1874
Duckett, Walter G.	1876
Dufour, Clarence Reuter	1876
Halleck, William Edward	1890
Hilton, Samuel Louis	1890

Johnston, Henry Augustus	1883
Lockhart, George Bradfield	1883
Major, John Richards	1873
Martin, John Charles	1883
MILBURN, JOHN ALEXANDER	1858
Milburn, Washington Coad	1883
Nattans, Arthur	1883
Pettengill, Edward True	1880
Schafhirt, Adolph Julian	1876
Simms, Giles Green Craycroft	1860
Thompson, William Scott	1871
Walton, Joseph Richardson	1883
Wehrly, Thomas McAleer	1883

CONNECTICUT.

Ansonia.

Bristol, Charles Edward	1880
Smith, Samuel Wheeler	1889

Birmingham.

Hogan, John Joseph	1890

Hartford.

Chapin, Frederick Hastings	1880
Goodrich, Stephen	1875
Goodwin, Lester Henry	1875
Rapelye, Charles Andrew	1876
Stoughton, Dwight George	1890
Williams, John Kirby	1875

Litchfield.

Gates, Howard Eugene	1873

Meriden.

Parker, John Herbert	1880

Middletown.

Pitt, John Richard, Jr,	1872

Naugatuck.

May, James Oscar	1875

New Haven.

Dimock, Robert Hemphill	1889
Francis, Walter Russell	1882
Gessner, Emil Adolph	1878
Spalding, Warren Alphonso	1876
Sperry, Herman Jay	1880
Wells, Romanta	1877
Wood, Alonzo Felton, Jr.	1890
Wood, James Prior	1890

New London.

Nichols, John Cutter	1886

Norwich.

Osgood, Hugh Henry	1875
Sevin, Nathan Douglas	1875

Putnam.

Dresser, George Edward	1886

Stamford.

Haight, William Bogardus	1872

Thomaston.

Williams, Charles Fish	1888

Thompsonville, Hartford Co.

Smith, Edward Newton	1885

Waterbury.

Bossidy, Bartholomew	1889
Munson, Luzerne Ithiel	1872
Wilcox, Frederick	1878
Woodruff, Roderick Samuel	1876

West Winsted.

Phelps, Dwight	1873

Willimantic.

Wilson, Frank Milton	1883

DELAWARE.

Wilmington.

Beetem, Jacob Samuel	1888
Belt, Zedekiah James	1876
Harvey, John Marsh	1890
Smith, Linton	1870
Stewart, Francis Edward	1884
Watson, Herbert Kennedy	1888

FLORIDA.

Apopka, Orange Co.

Kent, Robert Restieaux	1855

Fort George.

Rollin, John Francis	1859

Jacksonville.

Aird, William	1887
Dell, William Amos	1890
Hughes, George	1887
Watson, Sidney Powell	1887
Wooldridge, Napoleon	1883

Monticello.

Palmer, John Dabney	1888

Ocala.

Delouest, Edward	1890

Orlando.

Ink, Parker Peter 1888

Pensacola.

Cushman, Henry Clay 1887

Tampa.

Leonardi, Sydney Beauregard 1890
Snyder, DeWitt Clinton 1890

Waldo.

Wheeler, Lucien Fitch 1858

GEORGIA.

Atlanta.

Rankin, Jesse Willis 1877
Schumann, Theodore 1860
Sharp, Harry 1890

Augusta.

Durban, Sebastian Charles 1883
LAND, ROBERT HENRY 1859

Greenville.

Tigner, James Ogletree 1890

La Grange.

Slack, Henry Richmond, Jr 1890

Macon

Brunner, Norman Isaac 1878
Cheatham, Thomas Alexander 1890
Hunt, Leonard Washington 1878
Ingalls, John 1876
McConville, Thomas Aloysius 1864

Thomasville.

Bondurant, Charles Scott 1888
Thomas, Robert, Jr 1888

IDAHO.

Caldwell.

Smithson, David Elmer 1890

Murray, Shoshone Co.

Ingalls, Albert Orfila 1885

Wallace.

Sherwin, Eugene Alonzo 1889

ILLINOIS.

Altenheim, Cook Co.

McPherson, George 1865

Aurora.

Staudt, Louis Carl 1890

Bradford, Stark Co.

Plummer, David Gorham 1869

Camp Point, Adams Co.

Bartells, George Case 1881

Carlinville, Macoupin Co.

Loehr, Theodore Christian 1888

Chicago.

Bartlett, Nicholas Gray 1864
Behrens, Paul Johannes Heinrich . . 1888
Bell, John Irving 1890
BIROTH, HENRY 1865
Bishop, Samuel Edward 1890
Blocki, William Frederick 1863
Bodemann, Wilhelm 1887
Butler, George Frank 1883
Button, Charles Edwin 1881
Conrad, John 1887
EBERT, ALBERT ETHELBERT 1864
Fleischer, Adolph Theodore 1888
Frerkson, Richard Christopher 1888
FULLER, OLIVER FRANKLIN 1869
Gale, Edwin Oscar 1857
Gale, William Henry 1857
Galloway, David Henry 1889
Grassly, Charles William 1884
Hallberg, Carl Swante Nicanor . . . 1879
Hartwig, Charles Ferdinand 1881
Hogan, Louis C 1890
Hogey, Julius Henry 1880
Jamieson, Thomas Nevin 1888
Kadlec, Lawrence Wesley 1880
Kirchgasser, William Charles 1888
Lord, Thomas 1882
Maisch, Henry Charles Christian . . . 1885
Martin, Hugo William Conrad 1881
Maynard, Henry Sherman 1880
Miner, Maurice Ashbel 1880
Morris, William Gabriel 1890
Oldberg, Oscar 1873
Parsons, John 1865
Patterson, Theodore Henry 1869
Puckner, William August 1888
Rometch, Frederick Augustus 1889
Rhode, Rudolph Ernst 1887
Sargent, Ezekiel Herbert 1864
Scherer, Andrew 1884
Schmidt, Frederick Michael 1887

Truax, Charles . . . 1882
WHITFIELD, THOMAS . . . 1865
WOLTERSDORF, LOUIS . . . 1865
Zahn, Emil Augustus . . . 1881

Decatur.

Smith, Alexander Henry . . . 1888

East St. Louis.

Heller, George Gordon . . . 1890

El Paso, Woodford Co.

Strathman, Charles August . . . 1888

Highland.

Mueller, Adolphus . . . 1871

Moline.

Sohrbeck, George Henry . . . 1888

Momence.

Culver, Anson A. . . . 1890

Mount Sterling.

Rickey, Charles Francis . . . 1885

Peoria.

Benton, Wilber Merritt . . . 1888
Zimmermann, Charles . . . 1881

Peru, La Salle Co.

Hattenhauer, Robert Christopher . . . 1881

Saybrook.

Travis, Miles Beaty . . . 1889

Springfield.

Day, Charles Wesley . . . 1873

INDIANA.

Columbus.

Stahlhuth, Ernst Henry William . . . 1887

Evansville.

Schmidt, Florian Charles . . . 1882
Schlaepfer, Henry John . . . 1879

Fairmount.

Edwards, Nathan Wilson . . . 1879

Indianapolis.

Dill, John Byron . . . 1878
Eberhardt, Ernest Godlove . . . 1887
Field, Claud . . . 1890
Frauer, Herman Emanuel . . . 1881
Hurty, John Newell . . . 1882
Lambert, John Albert . . . 1879
Leist, Jacob Lawrence . . . 1881
Lilly, Eli . . . 1878
Lilly, Josiah Kirby . . . 1890
Sloan, George White . . . 1857

Jeffersonville.

Loomis, John Clarence . . . 1876

Lafayette.

Green, Arthur Lawrence . . . 1884
Hilt, David . . . 1879

La Porte.

Meissner, F. W., Jr . . . 1890

Michigan City.

Shrader, John L. . . . 1880

New Albany.

Knoefel, August . . . 1879

Seymour.

Andrews, Josiah Harding . . . 1879

South Bend.

Eliel, Leo . . . 1882

Terre Haute.

Baur, Jacob . . . 1879

IOWA.

Anamosa.

Soetje, Edward Conrad . . . 1888

Cedar Falls, Black Hawk Co.

Bryant, William Cullen . . . 1881

Clinton.

Majer, Oscar . . . 1880

Davenport.

Ballard, John Winthrop . . . 1871
Harrison, Jacob Hugh . . . 1883

Decorah.

Weiser, Emilius Ilgenfritz . . . 1880

Defiance.

Berringer, Will Jay . . . 1888

Des Moines.

Judisch, George . . . 1890

Dubuque.

Ruete, Theodore William . . . 1870
Torbert, Willard Horatio . . . 1887

Fort Dodge.

Oleson, Olaf Martin	1877

Fort Madison.

Schafer, George Henry	1871

Iowa City.

Boerner, Emil Louis	1877

Marshalltown.

Upson, Rosa	1887

Monticello.

Tiarks, Hermann	1876

Muscatine.

Krehe, John Theodor	1884

Oskaloosa.

Pickett, John Harvey	1887

Sioux City.

Moore, Silas Harwood	1880
More, Arthur James	1881
Scherling, Gustav	1884

Stuart.

Treat, Joseph Augustus	1885

Waterloo.

Wangler, Conrad David	1876

KANSAS.

Coldwater.

Sombart, John Edward	1881

Lawrence.

Leis, George	1869
Moore, John Thomas	1888
Sayre, Lucius Elmer	1883

Leavenworth.

Brown, Robert J.	1862

Peabody.

Roberts, Daniel John	1881

Perry, Jefferson Co.

Spangler, Henry William	1888

Salina.

Seitz, Oscar	1881

Topeka.

Merrell, Ashbel Hill	1884
Washburn, Harry Munroe	1890

Wamego.

Stone, Maurice Lewis	1888

KENTUCKY.

Carrollton.

Geier, Oscar William	1880

Covington.

Pieck, Edward Ludwig	1887
Zwick, George Albert	1874

Flemingsburg.

Reynolds, John Jefferson	1876

Frankfort.

Averill, William Henry	1874

Louisville.

Barnum, Joseph Powers	1887
Beckmann, Oscar Albert	1879
Colgan, John	1867
Diehl, Conrad Lewis	1863
Dilly, Oscar Charles	1888
Fischer, Phil	1883
Fowler, Joseph William	1890
Haeusgen, Henry Otto	1888
Jones, Simon Newton	1870
KESSLER, EDWARD FREDERICK	1879
Mueller, Otto Edward	1888
Newman, George Abner	1866
Peyton, Robert Docker	1887
Pfingst, Edward Charles	1874
PFINGST, FERDINAND JOHN	1867
Pfingst, Henry Adolph	1874
Rademaker, Hermann Henry	1879
Renz, Frederick Jacob	1883
Rogers, Wiley	1874
Scheffer, Emil	1872
Schiemann, Edward Bernard	1880
Schoettlin, Albert John	1882
Snyder, Robert Johnson	1887
Strassel, William	1870

Somerset.

Porter, Chilton Scott	1882

Uniontown.

Hardigg, William Leopold	1881

LOUISIANA.

Baton Rouge.

Brooks, Francis Marion	1879

Bayou Goula.

Viallon, Paul Louis	1870

Franklin.

Frere, Alexander Gabriel	1882

New Iberia.

Lee, James Augustin	1856

New Orleans.

Brand, Erich	1888
Brunswig, Lucien Napoleon	1887
Chalin, Louis Fisk	1887
Finlay, Alexander Kirkwood	1883
Godbold, Fabius Chapman	1887
Hall, Charles Knap	1887
Johnson, John	1887
Keppler, Christian Lewis	1882
Lyons, Isaac Luria	1875
Mellon, John Joseph	1883
Metz, Abraham Louis	1887
Moore, Thomas Ferguson	1878
Robin, Oscar	1887
Rudolf, Mrs. Eliza	1887

MAINE.

Augusta.

Partridge, Charles Kimball	1867

Bangor.

Harlow, Noah Sparhawk	1859
Sweet, Caldwell	1881

Bath.

Anderson, Samuel	1876

Belfast.

Moody, Richard Henry	1876

Biddeford.

Boynton, Herschel	1875

Ellsworth.

Parcher, George Asa	1875

Pittsfield.

Libby, Henry Fitzgerald	1882

Portland.

Cummings, Henry Thornton	1853
Dana, Edmund, Jr.	1877
Frye, George Carlton	1879
Hay, Edward Allston	1889
Hay, Henry Homer	1867
Perkins, Benjamin Abbott	1878

MARYLAND.

Annapolis.

Hodges, John Walter	1890

Baltimore.

Baxley, Jackson Brown	1856
Beck, Charles	1890
Brack, Charles Emil	1876
Burrough, Horace	1883
Caspari, Charles, Jr.	1883
Culbreth, David Marvel Reynolds	1883
Dohme, Charles Emile	1863
Dohme, Louis	1859
Edwards, William Fletcher	1883
Elliott, Henry Alexander	1859
Emich, Columbus Valentine	1863
Frames, John Fuller	1890
Gilpin, Henry Brooke	1889
Gosman, Adam John	1870
Hancock, John Francis	1863
Hancock, John Henry	1870
Hynson, Henry Parr	1890
Jennings, Nathaniel Hynson	1857
Lauer, Michael John	1865
Perkins, Elisha Henry	1857
Russell, Eugene Janus	1856
Schiller, William Charles	1890
Sharp, Alpheus Phineas	1855
Simon, William	1885
Thompson, William Silver	1856
Thomsen, John Jacob	1856
Thomsen, John Jacob, Jr.	1883
Westcott, James Walling	1890
WINKELMANN, JOHN HENRY	1864

Chestertown.

Stam, Colin Ferguson	1882

Cumberland.

Herman, John George	1878
Shriver, Henry	1876
Shryer, Thomas Wilson	1875

Hagerstown.

Winters, Jonas	1863

MASSACHUSETTS.

Andover.

Parker, George Hawkins	1874

Boston.

Babo, Leopold	1859

Bartlet, William Williams	1875
Bassett, Charles Harrison	1867
Boyden, Edward Cleveland	1874
Burnett, Joseph	1852
CANNING, HENRY	1865
Carter, Solomon	1865
Chapin, William Arms	1880
Colton, James Byers	1865
Cramer, Max	1881
CUTLER, EDWARD WALDO	1859
Doliber, Thomas	1859
DRURY, LINUS DANA	1871
Durkee, William Carley	1885
Godding, John Granville	1875
Jenkins, Luther Lincoln	1867
Jones, James Taber	1875
Kelly, Edward Samuel	1871
Leavitt, Miner La Harpe	1890
Lowd, John Colby	1871
Markoe, George Frederick Holmes	1863
Melvin, James Samuel	1853
Metcalf, Theodore	1857
Mowry, Albert Daniel	1884
O'Brien, James John	1875
Patch, Edgar Leonard	1872
Patten, Ichabod Bartlett	1858
Pierce, William Herbert	1879
Prescott, Horace Augustus	1875
Richardson, William Allen	1887
Sawyer, William Frederick	1885
Sharples, Stephen Paschell	1875
SHEPPARD, SAMUEL AIRUS DARLINGTON	1865
Siegemund, Charles Augustus	1882
Stowell, Daniel	1875
Thompson, James Henry	1890
Tucker, Greenleaf Robinson	1890
Turner, Thomas Larkin	1853
Williams, George Gorham	1888
Wilson, Benjamin Osgood	1859
Woodbridge, George Washington	1859

Cambridge.

Hubbard, John Henry	1866
Wood, Edward Stickney	1879

Cambridgeport.

Bayley, Augustus Ramsey	1859
Laing, Alfred Allan	1888
Orne, Joel Stone	1859

Charlestown.

Marshall, Ernest Clifton	1875
Stacey, Benjamin Franklin	1860

Chelsea.

Buck, John	1855
Buck, John Lynian	1883

Dover.

Colcord, Samuel Marshall	1852

East Pepperell.

Denham, Charles Sumner	1875

East Weymouth.

Hoyt, George Melvin	1875

Fitchburg.

Choate, John	1877
Estabrook, Henry Arthur	1886

Great Barrington.

Whiting, Frederick Theodore	1863

Holyoke.

Ball, Charles Ely	1885

Lawrence.

Whitney, Henry Martin	1859

Lee.

Pease, Francis Merrick	1880

Lowell.

Bailey, Frederick	1869
Butler, Freeman Hall	1874
Hood, Charles Ira	1871
Kidder, Samuel	1859
Robinson, Edward Augustus	1888

Marlborough.

Hartshorn, Frederick Arthur	1880

Middleboro.

Drake, Charles William	1873

New Bedford.

Blake, James Edwin	1866
Bunker, Elihu	1885
Hadley, Frank Rufus	1872
Lawton, Charles Henry	1873
Lawton, Horace Allen	1873
Shurtleff, Israel Hammond	1875
Taylor, John Pitman	1875
Wright, Edward Ellsworth	1886

Newburyport.

Goodwin, William W.	1853
Homer, John	1887

Newton.

Hudson, Arthur	1882

[North Andover.

Berrian, George Washington 1857

Peabody.

Grosvenor, Daniel Prescott 1881

Pittsfield.

Manning, John Henry 1889

Quincy.

Whall, Joseph Stokes 1873

Rockland.

Estes, Joseph Joslyn 1870

Rockport.

Blatchford, Eben. 1857

Salem.

Luscomb, William Edmund 1881
Nichols, Thomas Boyden 1876
Price, Charles Henry 1882
Price, Joseph 1888

Shelbourne Falls.

Baker, Edwin 1875

Somerville.

Cowdin, George Henry 1875
Flanagan, Lewis Cass 1875

West Acton.

Hutchins, Isaiah 1880

Worcester.

Bush, William 1875
Scott, George Theodore 1883
Williams, Duane Burnett 1881

MICHIGAN.

Ann Arbor.

Brown, Henry Jefferson 1882
Eberbach, Ottmar 1869
Mann, Albert 1889
Prescott, Albert Benjamin 1871
Schlotterbeck, Julius Otto 1888
Stevens, Alonzo Burdette 1885

Armada, Macombe Co.

Phillips, Edwin Freeman 1888

Battle Creek.

Wardell, Robert C. 1860

Bay City.

Henes, William Frederick 1876

Detroit.

Allen, William Humphries 1887
Baier, Charles George 1887
Bassett, Arthur 1888
Caldwell, James William 1875
Dupont, William 1887
Frizelle, Seymour Fuller 1888
Haynes, David Oliphant 1887
Holt, Alvin Everett 1888
Inglis, Frank 1887
Johnston, William, Jr 1888
Kennedy, Ezra Joseph 1887
Lyons, Albert Byron 1885
Perry, Frederick William Riley . . . 1885
Snow, Herbert Waldemar 1887
Stearns, Henry Albyn 1888
Stevens, Fred. D 1888
Stone, Clarence George 1884
Thompson, Frank Augustus 1888
Vernor, James 1866
Wagner, George William, Jr. 1888
Warren, William Matthew 1889
Webber, Joseph Le Roy 1886

East Saginaw.

Prall, Delbert Elwyn 1876

Grand Rapids.

Tibbs, William Henry 1871

Greenville.

Hall, William Alanson 1888

Holly.

Church, Howard Montague 1887

Ionia.

Gundrum, George 1882

Kalamazoo.

McDonald, George 1871

Loomis, Isabella Co.

Taylor, Celia Williams 1888

Manistee.

Lyman, Asahel Hubert , ... 1884

Muskegon.

Brundage, Fred. 1888
Jesson, Jacob 1872

Nottawa, St. Joseph Co.

Todd, Albert May 1885

Owosso.

Parkill, Stanley E. 1887

Red Jacket, Houghton Co.

Macdonald, Daniel Turner 1884

Saginaw City.

Keeler, William Henry 1872

MINNESOTA.

Duluth.

Boyce, Samuel F. 1871
Sweeny, Robert Ormsby 1866

Grove City.

Gayner, John Niles 1890

Minneapolis.

Allen E. Floyd 1885
Huhn, George 1884
Sanderson, Stephen Francis 1880

New Ulm.

Weschcke, Carl 1889

St. Paul.

Conger, Frederic Albert 1887
Qvale, Victor Asbgörn 1889
Simmon, Karl 1880
Stierle, Adolph 1882
Warren, Edwin Alonzo 1887
Wilkes, Arthur Perry 1887

Stillwater.

Hening, James Courtenay 1887

Waseca.

Rohde, Claus Frederick 1885

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William 1883

Jackson.

Ask, Matthew Franklin 1856

Port Gibson.

Shreve, John Alexander 1880

MISSOURI.

Carrollton.

Pettit, Henry McEwen 1860

Conway, Laclede Co.

Anderson, Jesse Nelson 1889

Freeman.

Dolan, Frank Linley 1888

Glenwood.

Gray, Gilbert Dillon 1881

Independence.

Wight, Oscar Martin 1887

Kansas City.

Eyssell, George 1889
Ford, William Thomas 1878
Gallagher, John Anthony 1881
Graham, Willis Hamm 1881
Lahme, Charles Adolph 1881

Marshall.

Franklin, Philip Henry 1881

Mexico, Audrain Co.

Llewellyn, John Frederick 1867

Moberly, Randolph Co.

Last, Louis Christopher August . . . 1888

Peirce City, Lawrence Co.

Armstrong, George Revington 1877

Pleasant Hill.

Buckner, John Armstrong 1890

Rich Hill.

Youngs, William 1883

Sedalia.

Fleischmann, Augustus Theodore . . 1885

St. Louis.

Ahlbrandt, Henry Ernst 1877
Alexander, Maurice William 1871
Blank, Alois 1881
Boehm, Solomon 1871
Catlin, Ephron 1871
Chamberlain, Guilford Tracy . . . 1853
Curtman, Charles Otto 1871
Fahlen, Julius 1889
Good, James Michener 1871
Grandjean, Charles 1871
Grandjean, Eugene 1871
Haigh, De Lagnel 1887
Hassebrock, Henry Fred. 1884
Hemm, Francis 1881
Hoenny, Adolph J. 1890
James, Frank Lowber 1888
Kleinschmidt, Anton Augustus . . . 1889

Klie, George Henry Charles	1878
Leitch, Arthur	1860
Mallinckrodt, Edward	1869
Meyer, Christian Fred. Gottlieb	1860
Morley, William Jarman	1876
Pauley, Frank Charles	1879
Physick, Henry Sandford	1870
Rohlfing, Charles Henry Ferdinand	1888
SANDER, ENNO	1858
Scheffer, Henry William	1863
Schurk, Louis	1890
Sennewald, Ferdinand William	1865
Sippy, Alvin H.	1890
Sohn, Frank	1888
Tomfohrde, Charles W.	1890
Tomfohrde, John William	1878
Uhlich, Ferdinand Gottlieb	1881
Vogt, John G.	1890
Vordick, August Henry	1874
Wall, Otto Augustus	1884
Westmann, Frank Henry	1882
Whelpley, Henry Milton	1887
Whitcomb, Frederick Ezekiel	1888
Wurmb, Theodore H.	1890

Boonville.

Wooldridge, Daniel Turley	1890

Weston.

Parr, John Conrad	1856

NEBRASKA.

Broken Bow.

Nicholson, William Sherman	1890

Lincoln.

Daubach, Charles Joseph	1889
Kostka, Bruno Otto	1889

Omaha.

Field, Amos	1871
Forsyth, James	1889
Goodman, Charles Frederick	1871
Kennard, Frank Bartlett	1883
Kuhn, Norman Archibald	1878
Seykora, Edward Joseph	1887
Sherman, Charles Rollin	1889

NEVADA.

Gold Hill.

Jones, John, Jr.	1889

Virginia City.

Perkins, William Alexander	1869

NEW HAMPSHIRE.

Claremont.

Spofford, Charles Byron	1884

Derry Depot.

Bell, Samuel Howard	1890

Dover.

TUFTS, CHARLES AUGUSTUS	1856

Greenville.

Hall, Charles Edwin	1884

Keene.

Hodgkins, Bert Willis	1888

Littleton.

Kenney, Herbert Eastman	1890

Manchester.

Miville, Francis Charles	1877
Smith, Amasa Daniel	1889

Nashua.

Morse, Charles Milan	1888
Whitman, Nelson Samuel	1875

New Market.

Dearborn, George Luther	1853

Portsmouth.

Green, Benjamin	1888
Preston, Andrew Peabody	1881

Somersworth.

Moore, George	1859

NEW JERSEY.

Asbury Park.

Woolley, Stephen Disbrow	1888

Atlantic City.

Bassett, Joseph	1880

Bayonne.

Alpers, William Charles	1890

Bloomfield.

Scherff, John Philip	1877
Wood, George Mervin	1890

Bordentown.

Carslake, George Middleton	1880

Bridgeton.

Dare, Charles Ford	1889
Davis, Theodore Garrison	1890

Burlington.

Vandegrift, John A. 1867

Camden.

Brown, Albert Potts 1870
Test, Alfred William 1870

East Orange.

Davis, George Randolph 1883
Williams, Seward Whiting 1887

Elizabeth.

Brant, Edmund Wade 1882
Frohwein, Richard 1867
Kent, Henry Avery, Jr. 1880
Oliver, William Murray 1875

Englewood.

Rockefeller, Lucius 1880

Freehold.

Walker, Ansell 1880
Walker, John Putnam 1881

Hoboken.

KLUSSMANN, HERMANN 1876

Jersey City.

Abernethy, Maxwell 1865
Beardmore, William Arthur 1890
Brown, James 1888
Dougherty, Samuel Edward 1875
Kennedy, Ewen Chisholm 1888
White, George Henderson 1868
Wienges, Conrad 1875

Keyport

Warn, William Edgar 1886

Matawan, Monmouth Co.

Slater, Frank Hovey 1882

Medford.

Thorn, Henry Prickett 1879

Morristown.

Carrell, Eugene Ayres 1875

Mt. Holly.

WHITE, AARON SMITH 1860

Newark.

Betzler, Jacob 1880
Bruguier, Francis 1876
Drescher, August 1886
HOLZHAUER, CHARLES 1873
Mennen, Gerhard 1888
Sayre, Edward Augustus 1877
Sayre, William Henry 1877
Smith, Charles Bradley 1868
Smith, Clarence Pennington 1890
Stamford, William Harrison 1876
Van Winkle, Abraham 1871

New Brunswick.

Kilmer, Frederic Barnett 1886
Rust, William 1870

Newton.

Ryerson, Henry Ogden 1882

Plainfield.

Miller, Joseph Gilbert 1886
Ollif, James Henry 1867
Reynolds, Howard Prescott 1875
Shaw, Robert Johnston 1875

Roselle.

Tiernan, Frank Mortimer 1880

Somerville.

Cook, Gilbert Snowden 1886

South Amboy.

JACQUES, GEORGE WASHINGTON . . . 1869

Trenton.

DeCou, James Clarke 1880

NEW YORK.

Albany.

Clement, Henry Bratt 1880
French, William Barker 1880
Gaus, Charles Henry 1879
Gaus, Louis Henry 1880
Gibson, Charles 1880
Huested, Alfred Birch 1879
McClure, William Henry 1880
Michaelis, Gustavus 1882
Sautter, Louis 1879
Turner, George Heather 1880
Walker, William John 1880

Auburn.

Stanley, Edgar Clarke 1880

Binghamton.

Otis, Clark Zelotes 1886

Brooklyn.

Aspinall, Walter Albert 1880
Baltzly, Albert Bates 1890

Benjamin, James Henry	1878
Brooks, George Washington	1879
Close, George Cassidy	1858
Curtiss, Charles Grenville	1866
Cutts, Foxwell Curtiss, Jr.	1875
Davis, William Mortimer	1879
Day, Carlos Erastus	1870
DeForest, William Pendleton	1879
Dennin, Charles	1875
Douglas, Henry, Jr	1875
Dunn, John Augustus	1867
Du Puy, Eugene	1852
Eccles, Robert Gibson	1885
FOUGERA, EDMOND CHARLES HENRY	1890
Haviland, Henry	1857
Heydenreich, Emile	1867
Krieger, Philip	1876
Lehn, Louis	1874
Levy, Adolph	1877
Livingston, Barent Van Buren	1872
McElhenie, Thomas Diamond	1872
Newman, George Anthony	1865
Niebrugge, John August	1861
Owens, Richard John	1860
Pyle, Cyrus	1859
Reynolds, Charles Edward	1882
Snyder, Ambrose Chancellor	1867
Squibb, Edward Hamilton	1882
Squibb, Edward Robinson	1858
Stevens, Luther Fuller	1879
Strachan, William Edward	1880
Zellhoefer, George	1876

Buffalo.

Drefs, Charles Adams	1882
Gregory, Willis George	1886
Hayes, Horace Phillips	1880
Peabody, William Huntington	1857
Rano, Charles Orlando	1866

Catskill.

Du Bois, William Laneman	1880

Cohoes, Albany Co.

Travis, J. Walton	1888

Corning.

Cole, Victor Le Roy	1890

Croton Landing.

Henry, Charles (Dworniczak)	1881

Elmira.

Holmes, Clay Wood	1873

Fairport.

Rich, Willis Simmons	1882

Fishkill on Hudson.

Moith, Augustus Theodore	1860

Flushing.

Hepburn, John	1873
James, William Tefft	1882

Geneseo, Livingston Co.

Rogers, Arthur Henry	1882

Gloversville, Fulton Co.

Miller, Jason Albert	1879
Van Auken, Jerrie A.	1880

Hannibal.

Brewster, Wadsworth J.	1880

Holley, Orleans Co.

Bishop, Francis Myron	1882

Jamaica, Queens Co.

Baylis, Lewis Fosdick	1880
Goodale, Harvey Galusha	1879
Peck, George Lyman	1883

Kingston.

Dedrick, William Frederick	1884

Middletown.

KING, JAMES THEODORE	1859
Rogers, William Henry	1869

Mount Vernon.

Gill, George	1872

Newburgh.

Chapman, Isaac Close	1887
Tartiss, Alfred Joseph	1867

New York City.

Atwood, Herman White	1873
Balser, Gustavus.	1875
Bedford, Peter Wendover	1859
Bendiner, Samuel Julius	1882
Billings, Henry Merry	1869
Chandler, Charles Frederic	1867
Davis, Benjamin	1869
Dick, Dundas	1879
Ditman, Andrew Jackson	1868
Dudley, Oscar Earle.	1877
Ebbitt, William Henry.	1889
Eimer, Charles	1872
Fairchild, Benjamin Thomas	1875

Fairchild, Samuel William	1887
Fink, Frederick William	1886
Fisher, William	1862
Ford, Herbert Lord	1890
Foulke, James	1881
Fraser, Horatio Nelson	1888
Fuller, Henry Weld	1865
Gardner, Henry Winslow	1867
Geisler, Joseph Frank	1889
Griffith, Albert Richard	1870
Hauenstein, William	1883
Hays, Benjamin Franklin	1886
Hays, David	1867
Hegeman, Johnson Niven	1880
Higgins, James Starkey	1862
Hoffmann, Frederick	1867
Hohenthal, Charles Frederick Lebe-recht	1865
Hudnut, Alexander	1857
Hughes, Albert Ernest	1888
Ihlefeld, Conrad Heinrich	1881
Jungmann, Julius	1879
Kalish, Julius	1875
Kemp, Edward	1888
Knapp, Frank Fiero	1880
Koles, Samuel Morse	1890
Lazell, Lewis Thurber	1858
Maclagan, Henry	1883
Macmahan, Thomas Jackson	1871
Main, Thomas Francis	1872
Massey, William Morton	1885
McIntyre, Byron Floyd	1876
McIntyre, Ewen	1873
McKesson, George Clinton	1888
McKesson, John, Jr.	1867
MILHAU, EDWARD LEON	1858
Molwitz, Ernest	1867
O'Neil, Henry Maurice	1879
Osmun, Charles Alvin	1868
Pfingsten, Gustavus	1873
Pleasants, Charles Henry	1890
Plummer, Edward	1889
Quackinbush, Benjamin Franklin	1886
Ramsperger, Gustavus	1860
Reichardt, Frederick Alfred	1871
Rice, Charles	1870
Ricksecker, Theodore	1870
Rockey, Walter Sprecher	1890
Rusby, Henry H.	1890
Schmid, Henry	1886
Schmidt, Ferdinand Traugott	1887
Scofield, James Stephen	1867
SEABURY, GEORGE JOHN	1876
Shiels, George Emanuel	1860
Skelly, James Joseph	1866
Smith, Reuben Randolph	1890
Starr, Thomas	1870
Tobin, John Martin	1887
Tscheppe, Adolph	1876
Turner, Isaac Worthington	1882
Vennard, William Lawrence	1888
Weinman, Oscar Christian	1873
Wichelns, Frederick	1881
Wickham, William Hull	1870
Wilson, William	1876
Winters, John Henry	1888

Nyack, Rockland Co.

De Graff, David	1879

Olean.

Coon, James Van Deventer	1880

Oswego.

Butler, Charles Henry	1887

Plattsburgh.

Smith, Jay Hungerford	1883

Port Chester.

Hyler, William Henry	1875

Port Henry.

Smith, Edward Salvister	1890

Potsdam.

Thatcher, Hervey Dexter	1865

Richfield Springs.

Smith, Willard Alfred	1880

Rochester.

Aman, Henry	1882
Davis, Edward Hatch	1880
Haass, George Herman	1872
Paine, James Dixon	1857
Schmitt, Joseph Max	1882

Rome.

Bissell, John Gordon	1875
Owens, James Alanson	1882

Saratoga Springs.

Fish, Charles Frederick	1866
Pennington, Thomas Henry Sands	1877

Schenectady.

Hanson, Willis Tracy	1880

Spencer, Tioga Co.

Ridgway, Samuel Augustus . . . 1882

Stapleton.

Roehrig, Albert Michael . . . 1890

Stillwater, Saratoga Co.

Schermerhorn, Winfield Scott . . . 1880

Syracuse.

Dawson, Edward Seymour, Jr. . . . 1876
Snow, Charles Wesley . . . 1876

Tonawanda, Erie Co.

Scoville, Charles Henry . . . 1882

Utica.

Blaikie, William . . . 1879
Cone, John Wright . . . 1876

Waterville, Oneida Co.

Bissell, Emery Gilbert . . . 1879

Wellsville, Allegheny Co.

Hall, Edwin Bradford . . . 1879

Yonkers.

Eschman, Frederick William Rudolf . 1880
Wray, George Brown . . . 1888

NORTH CAROLINA.

Charlotte.

Wearn, William Henry . . . 1888

Durham, Orange Co.

Vaughan, Parry Wyche . . . 1882

Fayetteville.

Sedberry, Bond English . . . 1882

Kinston.

Parrott, John Evans . . . 1890

Maxton.

Croom, James Dallas . . . 1890

New Berne.

Gooding, Robert Jacob . . . 1890
Hancock, Franklin Wills . . . 1888

Raleigh.

Simpson, William . . . 1873

Tarboro.

Zoeller, Edward Victor . . . 1878

Washington.

Gallagher, Charles Kewell . . . 1857

Wilmington.

Hardin, John Haywood . . . 1881

NORTH DAKOTA.

Devil's Lake.

Labold, Joseph M. . . . 1888

OHIO.

Ada, Hardin Co.

Ashbrook, Charles Shaw . . . 1887

Akron.

Armstrong, Andrew Moorehouse . . 1876
Inman, Charles Trask . . . 1885

Bryan.

Snyder, Alva Leach . . . 1873

Caldwell.

Bowron, Walter Henri . . . 1890

Canton.

McFarland, Thaddeus Day . . . 1887

Chillicothe.

Howson, Arthur Bayshawe . . . 1886
Howson, Walter Henry . . . 1875
Nipgen, John Alvin . . . 1879

Cincinnati.

Bain, Andrew Watson . . . 1874
Betz, Otto Edward . . . 1887
De Lang, Alfred . . . 1887
Eger, George . . . 1864
Fennel, Charles Theodore Piderit . . 1886
Goodman, Emanuel . . . 1879
Gordon, William John Maclester . . 1854
Greve, Theodore Lund August . . . 1864
Greyer, Julius . . . 1880
Heineman, Otto . . . 1864
Hildreth, Newton Gough . . . 1879
Hoffman, Julius . . . 1887
Karrmann, William . . . 1864
Klayer, Louis . . . 1884
Koehnken, Herman Henry . . . 1875
Lloyd, John Uri . . . 1870
Meininger, Albert . . . 1881
Merrell, Charles George . . . 1888
Merrell, George . . . 1879
Norwood, Theodore Franklin . . . 1887
Phillips, Charles Wilson . . . 1881
Ruppert, John . . . 1880
Sauer, Louis Wendlin . . . 1882

Schreck, Leocadio Santos	1881
Serodino, Herman	1880
Simonson, William	1887
Vilter, Hermann Theodore	1881
Wagner, Henry	1876
Walton, Harry Clifford	1881
Wells, Jacob David	1864
Wetterstroem, Albert Frederick Charles	1888
Yorston, Matthew Mackey	1564
Zuenkeler, John Ferdinand	1887

Circleville.

Evans, Samuel Barlow	1881

Cleveland.

Acker, Philip	1889
Asplin, John Harding	1882
Aubley, Samuel	1888
Ault, Charles Henry	1887
Biddle, Herbert George	1888
Bruce, James	1882
Cobb, Ralph Lathrop	1883
Deutsch, Julius William	1888
Dreher, Louis	1881
Feil, Joseph	1885
Fischer, Henry John	1888
Gaylord, Henry Cleveland	1869
Gegelein, Frederick Leonhardt	1881
Glines, George Walter	1881
Grosse, Gottlieb Matthew	1888
Haber, Louis Anthony	1881
Hahn, Sigismund Joseph Frederick	1887
Hechler, George Louis	1882
Heller, Marx Mier	1888
Hopp, Lewis Christopher	1876
Kieffer, George	1890
Kuhlmeier, Henry	1888
Lehr, Philip	1885
May, Arthur Ferdinand	1851
Mayell, Alfred	1872
Myers, Daniel	1882
Rosewater, Nathan	1880
Schambs, George Matthias	1882
Schellentrager, Ernst August	1882
Schoenhut, Christian Henry	1888
Scott, William Johnson	1872
Slosson, Frank West	1882
Smith, Joseph Stahle	1878
Smithnight, Albert	1882
Spenzer, Peter Ignatius	1872
Urban, Jacob Philip	1881
Voss, George William	1885

Columbiana.

Ink, Charles Elliott	1885

Columbus.

Bruck, Philip Henry	1884
Cook, Harry Clifford	1887
Herbst, Frederick William	1882
Hoffman, Otto Louis	1883
Huston, Charles	1872
Karb, George James	1883
Kauffman, George Beecher	1882
Schueller, Ernst	1881
Schueller, Frederick William	1880
Sherwood, Louis Walker	1882

Dayton.

Burkhardt, Mark Anthony	1887
Kurfurst, Henry Ferdinand	1881
Spengler, John George	1887

Delhi, Hamilton Co.

Carpenter, Samuel William	1883

Gallipolis.

Schaaf, Justus Henry	1875

Glendale, Hamilton Co.

Feemster, Joseph Hall	1873
Sayre, Eugene Augustus	1890

Grand Rapids, Wood Co.

Thurston, Azor	1886

Hartwell, Hamilton Co.

JUDGE, JOHN FRENCH	1866

Haselton, Mahoning Co.

Erwin, James Jay	1888

Logan.

Harrington, Frank	1869

Massillon, Stark Co.

Baltzly, Zachariah Taylor	1876
Kirchhofer, Peter Paul	1881

Middletown.

Johnson, Charles Brayton	1876

Navarre.

Grossklaus, John Ferdinand	1859

Norwood, Hamilton Co.

Weyer, John	1887

Red Bank, Hamilton Co.

Lammert, Cyrus Joseph	1881

Salem, Columbiana Co.

Hawkins, Michael Smith 1870

Springfield.

Casper, Thomas Jefferson 1867
Ludlow, Charles 1872
Siegenthaler, Harvey N. 1882

Tiffin.

Fleck, Jacob J. 1883

Toledo.

Deitz, Charles Jacob 1888
Hohley, Charles 1872
Reed, Isaac Newton 1881

Troy.

Tobey, Charles William 1879

Wooster.

Ohliger, Lewis Philip 1871

Youngstown, Mahoning Co.

Fischer, Emil A. 1887

Zanesville.

Hatton, Edgar Melville 1878

OREGON.

Portland.

Blumauer, Louis 1889
Clark, Louis Gaylord 1889
Dietrick, H. Dickson 1889
Laue, John Max Alfred 1889
Neppach, Stephen Albert 1889
Pfunder, William 1889
Woodard, Charles Henry 1889
Woodward, William Finch 1889

PENNSYLVANIA.

Allegheny City.

Armor, Alpheus 1882
Eggers, Frederick Hermann 1872
Slocum, Frank Leroy 1880

Allentown.

Klump, Charles Christian 1880

Beaver, Beaver Co.

Andriessen, Hugo 1875

Bristol.

Pursell, Howard 1880
Young, John Kroesen 1887

Carlisle.

Horn, Wilbur Fisk 1876

Connellsville.

Berryhill, Henry Pennick 1890

Easton.

Weaver, John Archibald 1873

Emporium, Cameron Co.

Heilman, Russell Pennrose 1889

Franklin.

Riesenman, Joseph 1883

Harrisburg.

George, Charles Theodore 1873
Gorgas, George Albert 1884
Gross, Edward Ziegler 1883
Miller, Jacob Augustus 1873
Weills, William Melanchthon Luther. 1885

Lancaster.

HEINITSH, CHARLES AUGUSTUS . . . 1857
Heinitsh, Sigmund William 1889

Lebanon.

LEMBERGER, JOSEPH LYON 1858
Redsecker, Jacob Henry 1881

Lock Haven.

Prieson, Adolph 1880

McKeesport.

Edie, John Bonar 1890

Meadville.

Zinck, Charles Morris 1888

Minersville.

Burns, John Kellar 1876

Mt. Pleasant, Westmoreland Co.

McElwee, Emer Judson 1888

New Haven, Fayette Co.

Hodgkins, Israel Marion 1887

Norristown.

Stahler, William 1880

Oil City.

Krosskop, William Burton 1887

Philadelphia.

Bauer, Louis Gustavus 1867
Blair, Henry Cowen 1868

Borell, Henry Augustus	1874
Boring, Edward McCurdy	1867
Bostick, Elmer Ellsworth	1888
Bower, Henry	1860
Bower, Henry Albert	1868
Bullock, Charles	1857
Burg, John Dellinger	1888
Campbell, Samuel	1864
Cook, Thomas Penrose	1877
Dobbins, Edward Tompkins	1867
Eberle, Charles Louis	1865
Eddy, Henry Clay	1869
Ellis, Evan Tyson	1857
England, Robert	1868
Finnerty, Edward John, Jr.	1887
Fox, Peter Paul	1869
French, Charles Stanley	1890
French, Harry Banks	1890
Früh, Carl Daniel Stephan	1876
Gerhard, Samuel	1873
Grahame, Israel Janney	1856
Grove, John Eberly	1868
Haenchen, Charles Eugene	1865
Hance, Edward Hance	1857
Hancock, Charles West	1868
Hanson, Arthur Edward	1888
Hassinger, Samuel Ellphat Reed	1880
Hayhurst, Susan	1890
Heintzelman, Joseph Augustus	1858
Hoskinson, John Thomas, Jr.	1881
Jenks, William Jenks	1858
Jones, Alexander Henry	1874
Jones, Daniel Sexton	1859
JONES, EDWARD CHARLES	1864
Keeney, Caleb Reynolds	1868
Kline, Mahlon Norwood	1878
Koch, Louis	1872
Krewson, William Egbert	1875
MAISCH, JOHN M.	1856
McIntyre, William	1868
McKelway, George Irwin	1874
Mellor, Alfred	1864
Miller, Adolph William	1868
Milligan, Decatur	1867
Moore, Joachim Bonaparte	1860
Morris, Lemuel Iorwerth	1880
Munson, James Harry	1889
Murray, Bernard James	1882
Newbold, Thomas Mitchell	1876
Ogden, John	1890
Ottinger, James Jeremiah	1876
Perot, Thomas Morris	1857
Pile, Gustavus	1881
Poehner, Adolph Adam	1889
Post, Elisha	1876
Preston, David	1868
Procter, Wallace	1874
REMINGTON, JOSEPH PRICE	1867
Richter, Gustave Adolph	1890
Riley, Charles William	1868
Rittenhouse, Henry Norman	1857
Robbins, Alonzo	1865
Rosengarten, Mitchell George	1869
Shinn, James Thornton	1860
Shoemaker, Richard Martin	1869
Spannagel, Charles Christian	1874
Taylor, Alfred Bower	1852
Thompson, William Beatty	1858
Trimble, Henry	1876
Walch, Robert Henry	1879
Warner, William Richard	1857
Webb, William Henry	1867
Weidemann, Charles Alexander	1868
Wendel, Henry Edward	1873
Wiegand, Thomas Snowdon	1857
Wright, Archibald Wesley	1868
ZEILIN, JOHN HENRY	1859

Pittsburgh.

Beach, Clifton Hilliard	1883
Emanuel, Louis	1878
Henderson, Archibald Keys	1888
Holland, Samuel Smith	1876
Kelly, George Armstrong	1882
Nisbet, William Washington	1883
Stevens, Salmon Henry	1885
Wheeler, Leonard Hiram	1883

Pittston.

Rhoades, Stephen Howard	1876

Pottsville.

Deibert, Thomas Irvin	1882
Kennedy, George Washington	1869

Reading.

Fox, Daniel Soder	1872
Stein, Jacob Henry	1869
Ziegler, Philip Milton	1867

Rochester, Beaver Co.

Finley, Ardon Chapman	1890
Finley, Norval Howard	1889

Schuylkill Haven.

Commings, Charles Samuel	1888

Scottdale, Westmoreland Co.

Cummings, Theodore Foster	1882
McNeil, John Murray	1882

Shamokin.

Smink, William Henry R.	1885

Shenandoah, Schuylkill Co.

McCarthy, Cornelius Joseph	1886

Towanda.

Porter, Henry Carroll	1880

West Chester.

Evans, Joseph Spragg	1877

White Haven.

Driggs, Charles M.	1881

Wilkes-Barre.

Jones, Samuel Stephen	1887
Wolfe, Nathaniel	1878

Williamsport.

Cornell, Edward Augustus	1873
Duble, Jesse Balderston	1870
Hill, Justin Luther	1887

York.

Patton, John Franklin	1880

RHODE ISLAND.

Newport.

Cole, Charles Mowry	1888
Cotton, William Henry	1885
Downing, Benjamin Franklin, Jr.	1886

Providence.

Alfreds, Henry James	1883
Blanding, William Bullock	1875
Calder, Albert Layton	1859
Cates, William Everett	1888
Danforth, Edmund Culver	1878
Fenner, Alexander Wilson	1888
Greene, William Ray	1883
O'Hare, James	1888
Reynolds, William Keyes	1876
Walling, Walter Augustus	1886
Wood, Mason Bowen	1882

Westerley.

Collin, Albert Burlingame	1882

SOUTH CAROLINA.

Charleston.

Aimar, Charles Pons	1879
Burnham, Edward Steinmeyer	1874
Eckel, Augustus William	1874
Marsteller, George Ludwig	1883
Michaelis, Charles Otto	1874
Panknin, Charles Frederick	1874
Vogt, Diedrich	1889

Columbia.

Thomas, Oscar Ernest	1882

TENNESSEE.

Athens.

Carter, George Fleming	1890

Bristol.

Bunting, Lindsay	1890

Chattanooga.

Greve, Charles Mathias	1887
Miller, Charles Gough	1889

Knoxville.

Yeager, Alvin Adams	1888

Memphis.

ROBINSON, JAMES SCOTT	1869

Nashville.

Burge, James Oscar	1878
Thompson, James Ligon	1888
Wharton, John Criddle	1872

Tracy City.

Patton, John Evander	1890

TEXAS.

Chillicothe, Hardeman Co.

Keller, Frederick Philander Peter	1888

Dallas.

Connor, Lewis Myers	1890
De Lorenzi, Albert	1890
Keene, Thomas Rucker	1888
Schweickhardt, Richard	1890
Weichsel, Francis	1881

El Paso.

Irvin, William Armstrong	1879

Fort Worth.

Harper, Harry Winston	1881
Powell, Thomas Wallace	1874
Wells, Ebenezer Miller	1878

Galveston.

Preston, Calvin Walbridge	1884

San Antonio.

Kennedy, James	1887
Schmitt, George Joseph Francis	1890

UTAH.

Salt Lake City.

Druehl, Frank August	1889
Farlow, John Boylan	1889

VERMONT.

Brandon.

Crossman, George Alvin	1872

Morrisville.

Gates, Amasa Oscar	1876

St. Johnsbury.

Bingham, Charles Calvin	1875

White River Junction.

Trask, Charles Mitchell	1875

VIRGINIA.

Charlottesville.

Wills, Frederick Miles	1890

Danville.

Cole, Howson White	1882

Fredericksburg.

Hall, Marshall Carter	1870

Gordonsville.

Stratton, Richard Henry	1890

Leesburg.

Pursell, Nicholas Sidney	1890

Lynchburg.

Craighill, Edward Addison	1888

Martinsville.

Kearfott, Clarence Piercall	1890

Norfolk.

Ingram, William Foster	1890
Jackson, Edward Calvert	1883
Masi, Walter Clements	1890
Phillips, William Francis	1890

Petersburg.

Beckwith, Edmund Ruffin	1886
Knock, Thomas Franklin	1882
Wright, Charles Lewis	1890

Richmond.

Baker, Thomas Roberts	1873
Briggs, Andrew Gessner	1890
Scott, William Henry	1873

WASHINGTON.

La Conner, Skagit Co.

Joergensen, Gerhard Johan Carl Sophus	1889

Seattle.

Kellogg, Gardner	1882

Spokane Falls.

Smith, Willard	1880

Walla Walla.

Holmes, Henry Elliott	1880

WEST VIRGINIA.

Charleston, Kanawha Co.

Boggs, Edwin Leslie	1872
Potterfield, Clarence Asbury	1882

Wheeling.

Bocking, Edmund	1874
Gray, William Howlett	1880
Menkemeller, Charles	1880
Williams, William Hudson	1880

WISCONSIN.

Eau Claire.

Blestren, Hans Markus Gunerius	1889
Godding, Edward Robert	1884

Fountain City.

Bechman, Charles Richard	1882

Janesville.

Prentice, Fred. F.	1876

La Crosse.

Beyschlag, Charles	1880

Madison.

Bernhard, Charles Henry	1888
Hollister, Albert Henry	1884
Kremers, Edward	1887
Power, Frederick Belding	1872

Mayville, Dodge Co.

Sauerhering, Rudolph Aurelius	1884

Milwaukee.

Conrath, Adam 1881
Crolius, Frank Marcelous. 1884
Dadd, John Alfred 1880
Drake, John Ransom 1860
Kienth, Hans 1884
Meissner, Paul Ernest 1888
Schrank, Charles Henry 1876

Neillsville.

Sniteman, Charles Clarence 1881

Wilson, St. Croix Co.

Williams, Benjamin Christopher . . . 1890

BERMUDA.

Hamilton.

Heyl, James Bell 1863

COSTA RICA.

Cartago.

Haussamen, Henry Louis 1888

San José.

Hermann, Frederick Francis 1888

DOMINION OF CANADA.

NOVA SCOTIA.

Halifax.

Simson, Francis Cook 1876

Kentville.

Masters, Robert Silas. 1883

Pictou.

Fraser, Robert Peden. 1885

ONTARIO.

Goderich.

Jordan, Francis 1877

Hamilton.

Clark, John Alexander 1890

Lindsay.

Gregory, Edmund 1875

Ottawa.

Saunders, William. 1860

St. Thomas.

Foster, William Orrville 1881

Stratford.

Waugh, George James 1862

Toronto.

Lander, John Cambridge. 1877
Lowden, John 1875
Robinson, Ernest Frankish 1889

Windsor.

D'Avignon, John Eugene. 1888

PRINCE EDWARD ISLAND.

Charlottetown.

Dodd, Simon Walker 1884
Johnson, Arthur Sterling 1889

QUEBEC.

Montreal.

Baridon, Louis Richard 1890
Gray, Henry Robert 1867
Lachance, Seraphin 1888

Quebec.

Morrison, Joseph Edward 1888

Three Rivers.

Williams, Richard Wellington. . . . 1883

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Burroughs, Silas Mainvielle, London, England	1876
Coblentz, Virgil, Berlin, Germany	1882
Mason, Alfred Henry, London, England	1884
Wellcome, Henry Solomon, London, England	1875

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Hale, Frederick	1855
Strachan, William Edward	1880

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Allen, Albert W.†
Angney, John R.†
Bohl, Conrad.†
Boyer, Harry.†
Bryant, Randolph F.†
Burley, Edwin P.†
Bury, Edward B.†
Clark, Frank P.†
Clarke, William B.*
Colcord, Joseph W.†
Crawford, Thomas D.‡
Crowther, Fred. A.†
Darrough, Charles H.†
Davenport, B. F.†
Dinsmore, Geo. F.‡
Dolloff, Albert S.†
Drake, Jonathan B.*
Dunagan, Jesse J.†
Duncan, Thurston B.*
Frames, James P.†
Garrison, Herod D.‡
Griffin, H. M.‡
Heun, Emil A.*
Hinsdale, Samuel J.*
Jacobus, Judson S.‡
Kephart, Henry.†
Laurent, E. L.†
Marquardt, Jacob F.†
Mason, Norman N.*
Mingay, James.‡
Morgan, Benjamin G.†
Mosher, Rosa B.†
Noble, John J.*
Norton, L. E.†
Padley, Wm. A.†
Paine, Milton K.‡
Pilsbury, Frank O.*
Rascoe, Lucius.*
Rendigs, Charles P.‡
Richardson, J. Clifford.‡
Richardson, James.‡
Robertson, Archibald C.†
Sands, George G.†
Schley, Steiner.†
Shivers, Charles H.†
Spitzer, George.†
Taylor, James H.‡
Thomas, James, Jr.*
Tilyard, Charles S.†
Tower, Levi, Jr.‡
Ude, George.†
Viall, William A.‡
Weber, William.‡
Wellington, Arthur W.†
Wilkins, F. M.‡
Wilson, Albert H.‡
Wilson, Julius H.†
Winslow, E. C.‡
Wohlfarth, Justin.*
Wynn, William.
Zeller, Wm. S.*

* Inability to attend the meetings. † No reason given. ‡ Left the business.

LIST OF DECEASED MEMBERS.

Since the last meeting, notice of the death of the following members has been received:

Nathan Dikeman,	Waterbury, Conn.	Elected 1859
Walter B. King,	Waco, Tex.	" 1883
Andrew J. Snively,	Hanover, Pa.	" 1883

LIST OF MEMBERS DROPPED

IN COMPLIANCE WITH CHAPTER VIII., ARTICLE III., OF THE BY-LAWS.

(See present volume, page 8, Minutes of the Council.)

Chas. H. E. Behre	Atlanta, Ga.
Sterling P. Bond	Little Rock, Ark.
Davis S. Carraway	Residence unknown.
Richard D. Collins	Crittenden, Ky.
Oscar H. Coumbe	Washington, D. C.
Zachariah W. Cromwell	Washington, D. C.
Jean M. Delavallade	New Orleans, La.
John W. Gilmore	New York, N. Y.
Joseph T. Hawkins	Mobile, Ala.
Herman Herzfeld	New York, N. Y.
Fred. W. Jillson	Pawtucket, R. I.
Edwin W. Lancaster	Marshall, Tex.
William F. Loveland	Elizabeth, N. J.
Joseph A. Mehringer	Jasper, Ind.
James C. Munds	Wilmington, N. C.
William H. Niblo	East Orange, N. J.
James T. Renouff	Atlanta, Ga.
Elias S. Russell	Nashua, N. H.
Frederick S. Senier	Chicago, Ill.
Wm. E. Sheffield	Benton Harbor, Mich.
J. Eagan Shorb	New Orleans, La.
Jacob V. Spears	Kissimmee, Fla.
Henry L. Warne	Laredo, Tex.
Wm. H. Wharton	Nashville, Tenn.
Goodwin R. Wiley	Bethel, Me.
John L. Yatman	Orange Valley, N. J.

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SECTION ON SCIENTIFIC PAPERS.

Thirty-Ninth Annual Meeting, to be held at New Orleans, La., commencing Monday, April 27, 1891.

Fellow Members: In accordance with usual custom, we submit the following list of queries, in the hope that each query may be selected by one or more to write upon, at an early date. Please note that the next meeting is to be held in *April*, instead of September, and it will be desirable that subjects selected be announced to the Chairman or Secretary at once, and that all papers be forwarded before March 10th, 1891, to allow time for printing for distribution at the meeting.

It is not necessary that choice be made from the list presented. Volunteer papers upon any subject of practical interest will be gladly received, but the Committee will esteem it a favor if the subjects of such papers are communicated as early as possible.

Chapter VII, Article IV of the By-Laws requests that lengthy papers be accompanied by an abstract, or a synopsis giving the essential points, that more time may be had for discussion.

The Committee on Publication have been directed to omit from the Proceedings any papers not in their hands in seasonable time (See Proceedings 1886, p. 170).

Attention is called to the Centennial Fund, the interest of which is to be used for defraying the expenses of suitable investigations—see Chapter VII of By-Laws of the Council. Should you desire to avail yourself of this Fund, please make application to the Permanent Secretary, Prof. J. M. Maisch.

To encourage investigation, the Ebert Prize is offered "for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit for the preparation of chemical or pharmacal products; provided, that in case no one of the essays is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected and the sum added to the Fund."

One of the objects of this Association, as stated in our certificate of incorporation, is "To improve the science and art of Pharmacy by diffusing scientific knowledge among apothecaries and druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business." In order that we may accomplish this object as fully as possible, your committee urge upon the members of the Association the necessity of preparing papers, which will add something to the advancement of the profession. We also recommend that an effort be made to attend the meeting, previously prepared to discuss the queries accepted by other members.

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LIST OF QUERIES.

1. Is there a reliable, expeditious method for the assay of Digitalis?

2. Is there a satisfactory formula for preparing an unchangeable Elixir of Three Phosphates (true phosphates) that will not precipitate when chilled, nor grow dark with age?

3. Is there a satisfactory process for purifying Asafœtida?

4. What relation does Bacteriology sustain to Pharmacy?

5. A practical method for detecting adulterations in Copaiba is wanted.

6. A paper on the practical use of the microscope in the drug store.

7. What is the relative value of Fluid extracts made from green and dried Alkaloidal drugs?

8. Pharmaceutical Notes.

9. Composition of the juice of Taraxacum root. It is desirable to determine at intervals, during the year, beginning as early and continuing as late in the year as freezing weather will permit,—1st. The percentage of juice obtainable by expression; 2d. Its specific gravity; 3d. Total solids; 4th. Ash; 5th. Sugar; 6th. Inulin and other Carbohydrates; and 7th. If possible, the bitter principle.

10. A paper on the advantages and disadvantages of 50% Tinctures.

11. The best process for preparing Glycerin Suppositories.

12. A pleasant means for administering Saline Cathartics other than Magnesia.

13. How to remove Peptone from Pepsin, chemically, without injuring the ferment?

14. Some things a Pharmacist may learn from modern surgery.

15. A paper on Potash as now made in the United States.

16. It is known that the 50% U. S. P. Phosphoric Acid does *not* show microscopic flocculi, while the U. S. P. 10% acid does: Would it not be well to drop the 10%?

17. It is claimed by practitioners that the formula of the U. S. P., 1870, for Tinct. Ferri Chloridi, gives better therapeutic results than the present one: If so, why not return to it for 1890?

18. Scotch Potassium Prussiate commands in our market a better price than American or German: Is there any substantial argument to offer for such preference?

19. The only test stated to be reliable for Terebene is its optical inactivity: If left rotary and right rotary turpentines are so mixed as to be optically inactive, how distinguish the mixture from Terebene?

20. Cannot a simpler, more reliable test for the Lithium Salts than that of the U. S. P. be devised?

21. Cannot a practical formula for making 50% Phosphoric Acid from Bone Phosphate, be substituted for the present U. S. P. method, using Phosphorus?

22. Should not both Ammonium and Potassium Alums be official, since the latter is rarely supplied?

23. A simpler and more practical method than that of the U. S. P. for estimating the per cent. of Quinine in total bark alkaloids is wanted.

24. Supply satisfactory formulæ for Saccharated Iodide of Iron and Soluble Oxide of Iron.

25. Cannot a process for Granular Sulphate of Iron C. P., replace that for Precipitated Sulphate of Iron?

26. The medical profession demand a higher grade of Ether than that prescribed by the U. S. P.: is the demand based upon reason or prejudice?

27. Silica in the form of an *impalpable* powder would make an excellent substitute for chalk in tooth powder. Furnish a process for its preparation.

28. Ozone is probably the best bleaching and disinfecting agent known. No practical or economical method has yet been devised for its production.

29. The electric current is used as a means of obtaining chlorine for purposes of bleaching, by decomposition of Chlorides in solution: Devise a similar method of bleaching with Nascent Oxygen freed by means of the electric current.

30. A paper on the preparation and properties of Cinnamic Alcohol and Aldehyd.

31. What is the comparative value of Cresylic and Carbolic Acids as germicidal agents?

32. Surgeons require Aseptic as well as Antiseptic materials. Should not the Pharmacist satisfy the demand?

33. What is the simplest and cheapest way of making Iodoform Gauze?

34. Culture media used in bacteriological work can be profitably made by the Pharmacist. Is there a demand for them? If so, a paper on their preparation is needed.

35. Synthetic Carbolic Acid has appeared in the market. How does it compare with the other higher grade acids? What causes its reddening?

36. The 1890 U. S. P. will employ the metric weights and measures. It is important that those for whom the Pharmacopœia is intended should understand its weights and measures, and be prepared to use them and not a translation of them. Suggest the best method of securing this condition.

37. Does, and to what extent does, Alcohol of the percentage occurring in Wine, Essences and Elixirs of Pepsin affect the digestive power on keeping?

38. The Ointments of the U. S. P. being of too low a melting point, need a consideration toward correction. Can suggestions in this regard be made?

39. Many of the officinal plaster formulas furnish products which are impractical for spreading and are too hard if spread. Can suggestions for their improvement be made?

40. What is the cause of the darkening of Syrup of Hydriodic Acid? It is stated that the brown color is not due to free Iodine. How can the darkening be prevented?

41. What is the cause of the darkening of Syrups containing Phosphate of Iron? How can this color change be remedied or prevented?

42. Is the addition of Ethereal Oil to Compound Spirit of Ether desirable? In Germany the absence of this oil, occurring as a contamination from process of manufacture, is demanded on the ground that its action is antagonistic to that of pure constituents of Hoffman's Anodyne.

43. What is the best practical method for taking fusing points, and what is the most desirable fusing point for Petrolatum?

44. Is Wood Alcohol used by any manufacturers in preparing Pharmaceuticals?

45. Processes for estimating Tannic Acid and for determin-

ing the percentages and the separation of Strychnine and Brucine are wanted.

46. In preparing Oleates, which produces the best results, Oleic Acid or Soap?

47. What is the best method of preserving Mucilage of Acacia?

48. Does the Bisulphate of Quinine of the market contain more Cinchonidine than the Sulphate?

49. Is it desirable that a Citrate of Iron and Quinine containing Ammonia be made official?

50. What is the difference between White and Red Oil of Thyme?

51. What proportion of Cinchona Barks of commerce will answer the U. S. P. tests?

52. Are the Compound Cathartic Pills of commerce prepared in accordance with the U. S. P.?

53. Is Glucose substituted in the preparation of commercial Medicated Syrups?

54. Is Digitalis raised in America equal, therapeutically, to that raised in England, or to that grown wild?

55. Name a process for making a good, Odorless Liquid Disinfectant?

56. What percentage of Alkaloids do the present Tinctures of Belladonna and Hyoscyamus respectively contain? Is our market supply of these drugs free from foreign impurities?

57. Can any of the Pharmacopœial Extracts be prepared of standard strength in powdered form?

58. What is the quality of the Powdered Extracts of Ergot and Cannabis Indica of the market?

59. What is the natural combination or association of the alkaloids and resinous constituents of Veratrum Viride?

60. What is the nature of the change which solutions of Morphine Salts, notably the Hydrochlorate, undergo by time, and what is the crystalline body which makes its appearance?

61. A determination of the total alkaloids in commercial Nux Vomica, answering the U. S. P. description, percentage of extract yielded to 80% alcohol, and percentage of total alkaloids in dry extracts, both pilular and oil-free, with reference to adopting standards of strength for the officinal preparations of the drug.

62. Report upon the extractive percentages of whole and powdered Nux Vomica of the market. State whether the use of steam preparatory to grinding the seeds affects the extractive percentage or the alkaloidal strength.

63. Examine Tinctures and Fluid Extracts of Aconite, Belladonna, Stramonium, etc., made from the same specimen of drug with official menstrua, and ascertain their relative alkaloidal strengths.

64. Is Creolin identical, chemically and physically, with Phenyl?

65. To what extent are flowers cultivated in this country, for the purpose of manufacturing Perfumes?

66. What is the best method for the determination of Glycerin in Beer and similar products?

67. What antiseptic is best suited for Aqueous Solutions of Alkaloids?

68. Would not Chemical Symbols in addition to the official titles be advantageous on the Labels of Shelf Bottles?

69. To what Plant does the name Grindelia robusta properly belong?

70. To what extent should water be used in the extraction of Drugs for which Alcohol is ordinarily directed, as in the Tinctures of Musk and of Vanilla?

71. What advantages, if any, are there in the preparation of the Syrups from the Fluid Extracts instead of by water extraction direct from the drug?

72. It has been suggested that part of the sugar and water in the Syrups be replaced by Glycerin to render them more stable. To what extent and in what proportion would this be desirable?

73. Are the combinations of Caffeine with Hydrochloric Acid and other acids true Chemical Compounds? If so, what should the compound with the first mentioned acid be termed?

74. Has Dilute Hydrocyanic Acid made by the U. S. P. '80 process, proven to keep better than the plain aqueous solution under similar conditions? Can any further change be made that will make the preparation more permanent?

75. What is the substance sold under the name Lactophosphate of Lime and Lactophosphate of Lime "Soluble"?

76. What reliable preparation of Granatum can be devised for introduction in the U. S. P. '90?

77. Should solution of Bimeconate of Morphine be rendered officinal? If so, what should be its Morphine strength?

78. It is alleged that heat very seriously affects preparations of Rhubarb, and that the Extract (solid) in particular is often worthless. Investigations on this point are desired.

79. What is the nature of the *powdered* Oleate of Copper of the market? Can a true Oleate of Copper be prepared?

80. Investigations with reference to determining the relative proportions in the Extract of Malt and Cod Liver Oil Emulsions of the market are desired.

81. What is the strength of Nitric and Hydrochloric Acids of the market? It is said that Nitric Acid is always below, while Hydrochloric Acid is nearly always above the required strength.

82. What is the best process for Benzoinated Lard?

83. It has been reported that the precipitation in Aromatic Spirit of Ammonia prepared after the present official process can be prevented by permitting the solution of the Ammonium Carbonate and Ammonium Hydrate in water to stand for some time before the alcoholic solution of the oils is added. A full investigation is desired.

84. Experiments on the emulsifying properties of the different kinds of Pancreatin are desired.

85. Are the officinal menstrua used in the Fluid Extracts of Erythroxylon and Cinchona such, that they while thoroughly exhausting the drugs of their desirable medicinal principles, also retain these in solution?

86. Is it desirable or possible to fix in the next Pharmacopœia a standard, physiological or chemical, for Aconite, or prescribe any lower limit of strength for its various preparations?

87. Can a satisfactory Powdered Extract of Nux Vomica be produced? Is it not desirable to replace the present Extract with a Powdered Extract, or at least to make both kinds official?

88. Report upon the Abstracts with reference to their retention in the U. S. P. To what extent can those at present officinal be made more concentrated without impairing their pharmaceutical or medicinal value?

89. A quick and reliable method for estimating the value of Mustard is desired.

90. Does the composition of Effervescent Mineral Salts offered in the market justify their name?

91. Would not the study of Therapeutics by the Pharmacist—that portion of this science consistent with Pharmacy,

—have a tendency to bring together, rather than repel, the professions of Pharmacy and Medicine?

92. What is the duty of the professional Pharmacist regarding Patent Medicines? Discuss the subject from the standpoint of the public and of the physician. What is a conservative course?

93. Outline a policy of work through which the representation of Pharmacists as delegates to the Section of Materia Medica and Pharmacy of the American Medical Association may be productive of the highest scientific and professional advancement.

94. Comparison of the following methods of making Acetic Ether. (*a*) Distilling a mixture of Sodium Acetate, Alcohol and Sulphuric Acid. (*b*) Passing CO_2 into Alcoholic Solution of Potassium Acetate.

Queries on behalf of the Committee on Legislation and Education.

1. Present an outline of the chief provisions for an ideal Pharmacy Law, practicable of application to most, if not to all, of the States of the Union.

2. Some practical suggestions and experiences in securing Pharmacy Legislation are desired.

3. What are the gains and what the losses sustained by pharmacists by reason of State Pharmacy Laws, and to what extent have these Laws exerted an influence upon the public?

4. Should not the existing Laws for the regulation of Pharmacy in the different States be so modified as to require registration from the principal or manager of a drug store only?

5. Under the Statutes of the Civil Law, the owner or principal of a drug store is responsible for the acts of his clerks; would it not therefore be just and proper that he should be the judge of the fitness and qualifications of those whom he employs?

6. Should not every State amend its Pharmacy Laws so that all persons desiring to establish drug stores within its limits, be compelled to successfully pass the examination of the State Board, whether or not the applicant be a Graduate of Pharmacy?

7. Should not the interchange of certificates of registration apply to those only who are seeking employment, and not to those who are to enter into business on their own account, or to manage a store for others?

8. Should a certificate of registration as *Pharmacist*, issued after examination by a Board of Pharmacy in one State, not entitle the owner to a certificate as *Assistant Pharmacist* in all other States, without further examination?

9. Would reciprocity in registration be practicable through the medium of uniform examinations, questions coming from a common centre?

10. A classification of the substances known as the "usual Domestic Remedies" is desirable for reference in connection with defining the scope of substances included in the Pharmacy Laws. Can such a compilation be made?

11. What opportunities are presented by the U. S. Government, in its various departments, for the services of pharmacists thoroughly qualified in Botany and Chemistry?

12. What is the standard of education acquired in the public schools in different parts of the country? What is the curriculum in the high schools of large cities, and how well is it adapted to subsequent Pharmaceutical study?

13. To what extent may the apprentice system be carried out in Pharmacy? Are the laws in the different States, and the forms of indentures employed in the trades, (such as are obtainable from dealers in legal blanks) adaptable to Pharmacy?

14. Previous to being registered as an apprentice in Pharmacy, an examination, testing the general education, is required in Great Britain. Similar laws are in force in several European countries. Can the same object be obtained in the United States? What amendments to our present Pharmacy Laws would be required to secure a desirable degree of general education, preceding the entrance upon an apprenticeship in Pharmacy?

15. Has not the time arrived when students attending lectures in Colleges of Pharmacy should not be clerks in drug stores, but should devote their whole time to work in the Colleges, and to their studies?

16. Is it desirable to secure theses from applicants for graduation from Colleges of Pharmacy? If so, give an outline of what should constitute a thesis.

17. The modern cry is for practical knowledge. Where, in Pharmacy-teaching, are the limits between practical and impractical knowledge, and what constitutes a practical examination?

18. To what extent should the study of Botany be compulsory in Colleges of Pharmacy, and what are the best methods of giving instruction in that branch, so as to make it interesting to the student?

19. Give an outline of what should constitute a course in Microscopy at a College of Pharmacy.

20. Outline a practical course of training for a Pharmaceutical Laboratory.

21. Should not every student of Pharmacy be trained sufficiently in practical analysis to be able to perform at least the various tests and assays required by the U. S. Pharmacopœia, and should the Boards of Pharmacy not require that knowledge in their examinations?

22. Would not the Pharmaceutical education of our young men be greatly improved, and the professional status of the apothecary be materially elevated, by increasing the time required at the Colleges of Pharmacy to three sessions (of six months each), the last of which should be devoted entirely to advanced practical work in Microscopy, Pharmacology, Chemical Analysis, and Pharmaceutical Assaying?

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